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The Theoretical Basis OF THE SANOCRYSIN TREATMENT OF TUBERCULOSIS.

BY

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ALTHOUGH chemical substances have been employed to a very large extent in the treatment of tuberculosis no real chemotherapy of this disease has hitherto been developed. The treatment here described represents an attempt to build up a chemotherapy in the sense of Ehrlich and Morgenroth; it cannot, however, be too strongly emphasized that this treatment is to be considered as a beginning only, and as probably showing a way out of the present *embarras des richesses* in the therapy of tuberculosis.

Chemotherapy in the sense of Ehrlich is not to be understood merely as treatment with chemical substances only, and its effect is not due to any local action at the site of injection. Chemotherapy means the introduction into an infected organism of a substance having a directly injurious influence on the parasite and forcing this influence upon the parasite at long distances from the place of introduction. The possibility of such effect is intimately connected with a *specific affinity* of the substance for the parasite. Without such affinity it is hopeless to attempt to influence the parasites in any generally infected organism by means of chemical agents. As a specific affinity of any chemical substance to any parasite hardly exists without some affinity to the cells of the infected organism itself, the rate of parasitotropy to organotropy decides the question of the applicability of any substance as a chemotherapeutic agent. Ehrlich expressed this fact by means of the chemotherapeutical index. The existence of this index, however, means that a substance which is poisonous to a parasite will also exercise some toxic effect upon the infected organism. It is for science to reduce this toxic effect as much as possible, but it is necessary to emphasize the fact that even in the case of the most complete reduction of organotropy patients having a lesser tolerance to a certain compound than the average will be met with. Every injection of a chemical substance into the blood of any human being, therefore, always implies some risk, which must be balanced against the risk of giving no chemotherapeutic treatment.

To kill and dissolve bacilli in an organism by means of a bactericidal substance very often has the same effect as to inject killed or avirulent cultures—that is, it has an immunizing effect. The injection of the bactericidal substance produces an "ictus immunicatorius" (Ehrlich). Hence chemotherapy not only means bactericidal treatment, but also indirect immunization with liberated antigen. It may, however, under certain conditions produce another indirect effect. If the antigen is very toxic or is liberated in very large amounts, or the capacity of the organism for building antibodies for one reason or another is diminished, the injection of the bactericidal substance produces a more or less grave toxaemia, increasing in some cases to a deadly effect. We are already acquainted with such cases in the chemotherapy of spirilloses, and present knowledge of tuberculosis is in reality sufficient to make us expect the same to happen in the chemotherapy of that disease also.

The natural reaction of the therapeutist to this is to diminish the dose of the bactericidal substance. It must, however, be clearly understood that the effect not only depends on the quantity of the dose, but also on the amount of easily influenceable bacilli in the organism; further experience of chemotherapy has shown us that minimal doses are not only without effect, but in some cases even stimulate the disease ("effectus contrarius"—Ehrlich). Reduction of the dose, therefore, does not always solve the question of toxaemia. Where this effect is prominent chemotherapeutic treatment can hardly be carried through without the help of an active or passive immunization of the infected organism against the liberated toxins. In these cases clinical treatment must be carried out as a combined chemo- and sero-therapeutical treatment.

These are the principal ideas of chemotherapy founded on the work of Ehrlich and built up on the numerous investigations following in the wake of salvarsan.

For the last twenty years numerous chemical substances have been tried against tuberculosis, and the investigations into the influence of chemicals upon the tubercle bacilli outside and inside the organism are legion, the substances used ranging from dyestuffs to organic and inorganic compounds of heavy metals. In recent times German workers have made extensive investigations into the effect of heavy metals on tuberculosis (Tinkler, v. Linden, Meissen, Strauss, Bruch and Glück, Feldt and Spies, Bethmann, Juncker, Mayer, Pekanowitsch, Kolle and Schlossberger, Görke and Töppich, and others), as have also certain French, English, and American investigators (Breton, Hollande and Gaté, White, de Wit, Wells, Long, Cathwell, Leard, and others).

There is not space here to record the details of these investigations, but as far as I can see their general results may be expressed by saying that they have proved that many compounds of heavy metals have a more or less pronounced growth-preventing influence on tubercle bacilli in culture, and that some of these compounds when injected intravenously retard the death of small tuberculous animals (rabbits, guinea-pigs), making the tuberculous lesions develop into a more sclerotic type. No real curative effect has, however, been observed.

From the failure to produce such effect, as well as from the fact that most of the metallic compounds employed have been too poisonous to the organism to be used in bigger doses in man, a new idea arose, supported first by pure theoretical considerations, but later on by experimentally proved facts, especially in Denmark (Walbum). In 1917 Feldt set forth his idea that the influence of the various metallic compounds (of gold, mercury, copper, bismuth, etc.) on the tuberculous processes is the result of a pure catalytic effect stimulating the natural reactions of defence of the organism—that is, its immunizatory processes. As a catalyser acts in very small concentrations, the logical consequence of this idea was the introduction of minimal doses into the therapeutics of tuberculosis. Feldt accordingly reduced the doses of krysolgan to a few milligrams injected at long intervals.

From Feldt's published statement it appears, as far as I can see, that this idea at the beginning was an ingenious but purely theoretical speculation. In recent times the possibility of exercising a stimulating effect on the production of antibodies by intravenous injections of small doses of various metallic salts has been proved by Walbum, and the whole idea of getting a clinical effect in this way supported by experimental facts.

On the other hand, no such clinical effect has at present been observed from most of the employed metallic compounds. Krysolgan seems only to have a detoxicating effect in certain cases of pulmonary tuberculosis and to cause quick healing in some cases of localized tuberculosis. The effect of the catalyser might, however, depend on its concentration in the body, as pointed out by Walbum, and recent investigations by him give support to this idea. Possibly, therefore, better results may be secured with some concentrations than with others, and there may be hope of something coming from the rational study of the influence of variations of the concentrations of metallic ions in the infected organism.

On the other hand, two things should never be forgotten: first, that the introduction of *the minimal dose* into human therapeutics in reality makes the assertion of the inefficacy of any substance on any kind of disease very difficult, especially in the case of the more chronic diseases, such as tuberculosis; and secondly, that a catalyser only augments the velocity of reaction and never alters the direction of chemical processes. By introducing a catalyser into a chemical system, whether a simple or complex system such as the organism, we cannot control the final

results of its reactions but only the velocity with which the possible results are obtained. All catalytic treatment therefore implies a profound knowledge of the pathological conditions of the individual organism at the moment of beginning treatment, and it does not seem probable that important progress in clinical treatment will be made in this way before the true nature of the immunization processes in the organism have been cleared up to a larger extent than they are at present.

For this reason I have felt it to be more hopeful to follow the lines of real chemotherapy drawn by Ehrlich and Morgenroth. In the special case of tuberculosis there is, however, one reason more. The results hitherto obtained in the chemical therapy of this disease are, it is true, not very encouraging; but, on the other hand, I have noted that in none of the numerous investigations of the different kinds of chemical therapy of tuberculosis has any attention been paid to some of the most prominent facts in the pathology of the disease—the specific resistance of the bacillus of Koch and the peculiar structure of the tuberculous tissue. I considered, therefore, that an attempt to develop a rational chemotherapy of tuberculosis with special regard to these two facts was still worth making.

A. The Chemistry of Sanocrysin Treatment.

It is a well known fact that the toxic effect of a heavy metal on the organism is exerted by the positively charged metallic ion. A chemotherapeutical compound of a heavy metal must therefore never introduce important amounts of free metallic ions into the organism. Hence it follows that the first step in diminishing the organotropy of any compounds of heavy metal is to enclose the metal in a real complex body, of which the stability is sufficient to keep the concentration of metallic ions in watery solution practically equal to 0. Further, it is evident that the complex body in which the metal is enclosed must not itself be poisonous to the organism, as is cyanogen. Finally, the whole complex must have such chemical qualities that the amount of it which does not enter into combination with the parasite is excreted unaltered, or, if decomposed, then without the forming of metallic ions or other bodies poisonous to the organism.

These are the fundamental conditions which make it possible to use a compound of a heavy metal as a chemotherapeutic agent without injuring the organism. To secure a bactericidal effect the substance needs further a specific affinity for the parasite in question. The general principle on which to find such an affinity, when no prominent properties of the parasite suggest a special method, is laid down by Ehrlich and Morgenroth in "the principle of chemical variation." In tuberculosis the whole question, however, is complicated by two pecularities in its pathology.

1. The specific resistance of the bacillus of Koch is due to its content of fatty substances, whose presence is the principal reason for the so-called acid-fastness of the bacillus and its resistance to antiformin and other generally employed disinfectants. A bactericidal effect of any compound of a heavy metal on tubercle bacilli is, therefore, not to be anticipated, except subject to the condition that the compound is capable of penetrating the fatty system and so carrying the metal into the body of the bacilli.

2. The peculiarity of the tuberculous tissue, which is of importance in chemotherapy, is its poverty in vessels. This means that a chemical compound must diffuse from the blood through the tissue to reach the tubercle bacilli, and the distance through which diffusion must take place grows longer as the tubercle increases in size and develops in caseification. Whether a chemical compound under these conditions reaches the bacilli or not is a question, not only of its more or less pronounced specific affinity, but also of the ratio of its diffusion velocity to the velocity with which it is decomposed in or excreted from the organism. The hope for chemotherapy in tuberculosis is therefore probably intimately connected with the possibility of finding a substance which diffuses very quickly through animal membranes, and which is sufficiently stable in the organism to be kept unaltered in the blood and the lymph for a relatively long time.

These last considerations led to the idea that if a substance is to influence tubercle bacilli in the organism, its bactericidal effect must be carried by a rapidly travelling ion of high stability. As recent investigations (Hamburger, Ege, Gürber, Bunge, Abderhalden) appear to show that negatively charged ions diffuse much more quickly through animal membranes than positive ions, it seemed probable that the ideal chemotherapeutic in tuberculosis would be a negatively charged ion. Hence the fundamental idea in the chemical theory of sanocrysin is to insert the heavy metal into a real complex, which is a rapidly travelling negatively charged ion with sufficient stability to remain unaltered in the body for a relatively long time. The heavy metal carried by the sanocrysin ion is gold, because all previous investigations showed that it exercises a greater influence on tubercle bacilli in culture than any other metal. This quality is, of course, only of importance as a guide. To act as a chemotherapeutic agent the complex ion must possess a specific affinity for the tubercle bacilli, and must be able to carry the gold through the lipoid system into their body.

So far I have found the sanocrysin ion to be the body which best fulfils this condition. The chemical constitution of sanocrysin is very probably to be written as follows:

$$\left(AuS_2O_3\right)^{Na}_{Na_2S_2O_3}$$

In watery solution it dissociates according to the equation:

$$Au(S_2O_3)_2Na_3 = AuS_2O_3 + S_2O_3 + 3Na$$

Its therapeutic agent is then the complex negatively charged ion AuS_2O_3. This ion has, according to my investigations, the following properties. It—

(1) Is *easily soluble* in water (1 gr. in 2 c.cm. water).

(2) Is a *real complex* and of great stability. Au is not generated by the usually employed strong reducing agents; H_2SO_3, SO_2, $SnCl_2$, $H_2C_2O_4$, KI do not affect the substance even at boiling temperature. Dilute hydrochloric acid does not affect it at ordinary temperature. H_2S decomposes the ion yielding gold sulphate. Highly concentrated watery solutions decompose slowly, especially in daylight, developing a yellow colour. Diluted solutions are unaltered in about fourteen days, when kept in a dark room.

(3) Is *rapidly diffusible*. The diffusion velocity of AuS_2O_3— through animal membranes is about 75 per cent. of the diffusion velocity of I—.

(4) *Remains* in the body for four to six days after injection into the blood.

(5) Is *partly decomposed in the organism*, evidently *yielding metallic gold*, and *partly excreted* principally by the kidneys in complex condition. When the urine contains gold it is not found in ionogenic form. H_2O_2 in alkaline solution decomposes the substance at 100° C. totally into gold and Na_2SO_4.

(6) Does *not precipitate* proteins, especially not the proteins of calf or horse serum, at a temperature of 38° to 40° C.

(7) Penetrates the lipoid system of the tubercle bacilli in a very short time, affecting the acid-fastness very gravely and carrying gold into the body of the bacilli in amounts which after a short time can be shown by microchemical reaction.

(8) Prevents the growth of tubercle bacilli in culture. On the medium I used, and which contained no peptone, I found the growth-limiting concentration to be 1 in 100,000. This value may, however, probably be altered on media of other composition. Especially it must be kept in mind that all media containing H_2S will decompose the sanocrysin and precipitate the gold as gold sulphate and metallic gold. In such media the growth-preventing concentration will increase; the question of growth-preventing properties is, however, of very small importance in chemotherapy. Dioxydiaminoarsenobenzol does not kill spirilli *in vitro* and is yet one of our strongest chemotherapeutic agents.

B. Pharmacology of Sanocrysin: Effects on the Healthy Organism.

As has been pointed out above, every chemical substance which has an affinity for a parasite may be expected to have some affinity for the cells of the organism. The organotropy of sanocrysin has not been cleared up in all its details, but the principal questions have been so far investigated that we have sufficient material to decide whether we can take the responsibility of injecting it into human beings or not. We know at present the following facts from investigations on calves, rabbits, and monkeys.

Circulation.—The intravenous injection of sanocrysin in doses of from 1 to 6 cg. per kilo of body weight does not affect the rhythm or rate of the heart; the blood pressure remains unchanged.

Red Blood Corpuscles and Haemoglobin.—Repeated intravenous injections of sanocrysin in doses up to 6 cg. per kilo body weight have no injurious effect on the red blood corpuscles or their haemoglobin.

Temperature.—Doses up to 4 cg. per kilo body weight do not affect the body temperature.

Body Weight.—Doses up to 4 cg. per kilo body weight do not influence the weight of the individual.

Liver.—Doses up to 6 cg. per kilo body weight have never caused any apparent injury to the liver and jaundice has never been observed.

Kidneys.—Sanocrysin is excreted principally by the kidneys. If a first dose of 2 cg. per kilo body weight is given it may be followed by slight albuminuria, which disappears within two or three days. If, on the other hand, the first dose does not exceed 1 cg. per kilo body weight, no albuminuria is caused; and subsequent doses of 3 cg. per kilo body weight are tolerated without causing any albuminuria. Generally the dose can be increased gradually up to 6 cg. without causing albuminuria. Thus the kidneys rapidly increase their tolerance to sanocrysin.

Intestinal Tract.—The administration of 2 cg. per kilo body weight produces no apparent effect on the intestinal tract. In monkeys 7 cg. have been tolerated without such effect.

Nervous System.—Doses up to 6 cg. per kilo body weight do not cause any detectable disturbance of the nervous system in healthy animals.

From these investigations it appears that sanocrysin in doses of from 1 to 4 cg. per kilo of body weight has very little effect on the sound organism. The weak point in the pharmacology of the substance is its action on the kidneys. This action is, however, avoided when the initial dose does not exceed 1 cg. per kilo nor the maximum therapeutical dose 2 cg. per kilo. Most animals endure bigger doses, and clinical experience has shown that the same is true in a large number of human beings.

On the other hand, the effect on the kidneys seems to be quickly reparable. Even with doses up to 6 cg. the albuminuria disappeared in a few days, and we have never found the lesions of the kidneys to develop in calves into chronic nephritis—even after six months' observation.

C. Immunobiological Principles.

From the preliminary investigations of Mafucci, as well as from researches by many different authors (Prudden and Hodenpyl, Strauss and Gamaleia, Calmette and Breton, Grancher and Ledoux-Lelard, Ussmann, Kostenich, Krompecher, Keller, Engelhardt, Baumgarten, and others), we know that killed tubercle bacilli can exercise a local as well as a general injurious effect on the healthy organism. The local effect consists in the formation of abscesses at the site of injection, while when the bacilli are injected into the blood miliary tubercles are produced in different organs. The general effects are emaciation, cachexia, and more or less pronounced intestinal disturbances.

These results lead us to expect that a chemical compound which kills tubercle bacilli in the organism will cause very serious toxaemia when injected into a tuberculous organism.

Further, the splendid investigations of Robert Koch showed that the healthy and the tuberculous organism react quite differently to the injection of killed tubercle bacilli or tuberculin. In the healthy animal the toxic effect is produced only by large doses of killed tubercle bacilli and takes a relatively long time to develop. Even very small doses of killed bacilli or tuberculin often, in tuberculous animals, cause very severe symptoms, which develop in a relatively short time, and are signs of an acute intoxication of the organism. These symptoms are well known to everyone who is acquainted with the so-called specific therapy of tuberculosis. It need only be emphasized here that we meet two different groups of symptoms according to the pathological condition of the organism. The first group is represented by the acute intoxication caused by injection of tuberculin into highly tuberculous guinea-pigs and other small animals in the very acute stage of the disease. As shown by Koch, this "tuberculin shock" generally kills the guinea-pig in six to thirty hours, with very pronounced and very constant pathological changes in different organs.

The other group is represented by the "tuberculin reactions" caused by injection of tuberculin or killed bacilli into tuberculous animals with a more chronic type of the disease. The principal symptom of this group is a rise in temperature, but when large doses of tuberculin are injected other symptoms are produced—namely, pain in the limbs, cough, pronounced faintness, nausea, and often vomiting. In many cases an exanthem similar to the rashes of measles appears on the neck and chest. Occasionally a slight icterus has been observed.

The injection into a tuberculous organism of a chemical substance which kills tubercle bacilli must therefore be expected to cause more or less pronounced symptoms of intoxication. As a general reaction the tuberculin shock has only been produced in guinea-pigs. Other animals seem to be more resistant. The production of shock in a larger animal might, however, only be a question of the amount of toxins formed in the body. It should therefore be strongly emphasized that to inject a bactericidal substance into a tuberculous organism may involve all the risks of tuberculin shock. At any rate, we must expect to find "tuberculous reactions," often in very pronounced degree.

On the other hand, it is clear that a chemical substance which is not capable of producing tuberculin reactions cannot be expected, when injected into tuberculous organisms not immune from tuberculin, to have any injurious influence on the tubercle bacilli. As almost all the larger (tuberculous) animals react to tuberculin, except in the earliest and latest stages of the disease, a curative effect produced by chemotherapy must always be associated with big reactions, unless we are able to produce total immunity, either active or passive, before the injection of the bactericidal substance.

From these considerations it follows that a substance capable of killing tubercle bacilli in the organism must also produce very severe reactions in the tuberculous organism when injected in doses which have no effect on a healthy animal. Is that true for sanocrysin? It has been mentioned above that this substance, injected intravenously in doses of 2 cg. per kilogram of body weight has no effect on the temperature, the body weight, and the intestinal canal, and does not cause albuminuria when a previous dose of 1 cg. has accustomed the kidneys to excrete the substance.

Experimental researches and the clinical experiences have shown quite uniformly that the tuberculous and the healthy organism react quite differently to this substance. A quarter, and in some cases one-tenth, of the dose, which is without effect on the healthy animal, produces the most severe reactions in the tuberculous organism, and in the experimental work and in clinical observations we have encountered all the different symptoms belonging to the two groups of symptoms observed after the injection of tuberculin into tuberculous animals and human beings.

Shock Produced by Sanocrysin.

Very early in my experiments I found that one-third of the sanocrysin dose which is tolerated by the healthy guinea-pig always produces very severe intoxication in the highly tuberculous guinea-pig, and usually kills the animal in sixteen to forty-eight hours. The pathological changes in the organs have always been absolutely identical with those found by Robert Koch in the tuberculous guinea-pig killed by tuberculin; in particular a large haemorrhagic zone was found surrounding the tuberculous lesions and spreading into the tissue around them.

In further experiments on highly tuberculous animals (goats, calves, monkeys) the same phenomena were observed. In monkeys especially, which are very sensitive to the intoxication, the shock could be made very significant; when the infection is set up by intraperitoneal injection with a small dose of human tubercle bacilli, monkeys develop a chronic tuberculous peritonitis, which does not cause death until after a period of about three months or more. If in the third week after the infection so small a dose as only 2 cg. of sanocrysin per kilogram of body weight were injected intramuscularly in one hind leg, a serosanguineous peritonitis develops in six to twenty-four hours, and the animal dies usually within forty-eight hours.

Goats, and calves more especially, though they are more resistant, yet very often die after only one injection of 2 cg. of sanocrysin per kilogram of body weight. In all cases pathological changes were found in the tuberculous organs of the same kind as in the tuberculous guinea-pigs. In calves, which ordinarily do not die until forty-eight

hours after the injection of sanocrysin, the development of the shock was investigated in detail. Ordinarily it begins with albuminuria, which develops into a grave parenchymatous nephritis. Shortly after the appearance of the grave symptoms of nephritis (increasing albuminuria, cylindrical casts and blood corpuscles in the urine) acute myocarditis appears. The third and last stage in the intoxication in animals affected with pulmonary tuberculosis is an extensive oedema of the lungs, which increases until the animals die, with frothy fluid exuding from the mouth and nose. Shortly before death a very significant clinical symptom occurs—namely, a fall in temperature, usually of 2° to 3° C. In most cases the animal dies at the lowest point in the temperature curve; but in some cases it recovers temporarily, to die one or two days later.

Serotherapy of Sanocrysin Shock.

Investigation of thirty large tuberculous animals treated with sanocrysin pointed to the fact that the shock mainly occurred during two distinct periods—namely, during the first three weeks after the artificial infection, and during the last weeks before death. As it is well known that the measurable antibodies in the blood are very much diminished, if not totally absent, in these two periods, I came to the conclusion that animals in the more chronic period might contain antibodies which were capable of protecting them from the shock. To test this I injected serum from a calf, affected with chronic tuberculosis for about three months, intravenously into two tuberculous calves suffering from grave shock produced by a sanocrysin injection. The result was striking; these calves recovered clinically in a few hours, and the albuminuria disappeared in twenty-four hours. From this observation I concluded that it might be possible to immunize animals against shock.

As the development of the shock is rapid there will never be time to produce an active immunity in an acute case; the protection against the shock must be by means of a passive immunization—that is, by way of serotherapy. The truth of this idea has been shown by demonstration that it is possible to protect tuberculous animals against the shock and to cure the shock by means of a serum produced by immunization of healthy animals with killed tubercle bacilli.

This serum was first produced in calves by repeated injections of killed tubercle bacilli and tuberculin. At present it is made by injection of defatted, formalin-treated tubercle bacilli, according to Dreyer's principle. By means of this antigen the strength of the serum has been increased, and it has been possible to make it in horses.

With this serum forty tuberculous calves and goats, suffering from albuminuria after sanocrysin injection, have been treated on more than 120 occasions. In all cases where the infection has been reasonable the albuminuria has disappeared, in most cases very quickly, but in some more slowly, and the shock was totally prevented. Only in cases in which the injection has been very much too large (animals infected with more than 7 cg. of virulent tubercle bacilli injected intravenously) the serum has not always been able to prevent the shock. This suggests that study of the serum question may contribute very much to the efficiency of the treatment in the grave cases of very acute progressive disease.

The experiments on calves and monkeys, as well as clinical tests on human beings, have uniformly shown that the serum is capable of curing the shock, when injected intravenously in sufficient doses at the very beginning of the fall in temperature. If, however, the collapse has continued for any considerable time, the serum injection may be followed by temporary recovery, but death ensues from failure of the heart. In clinical treatment it should therefore always be the rule to inject serum at the earliest appearance of the albuminuria as it is the first sign of impending shock. It is, of course, true that albuminuria is not on every occasion followed by shock, but it is not always possible to decide in which case this will happen and in which it will not. The clinician must be very careful on this point, and not omit the serum treatment in any case before he has acquired sufficient experience to be able to judge the condition of his patients during the sanocrysin treatment.

As far as I can see, all these investigations prove that sanocrysin in tuberculous animals and human beings can produce an acute intoxication, which does not occur when much larger doses are injected into healthy animals, and that this intoxication can be prevented or cured by means of a serum made by immunization of healthy calves and horses with defatted formalin-treated tubercle bacilli. Consequently it is possible to confer upon tuberculous animals and human beings a specific immunity against the lethal effect of sanocrysin. This is probably the best proof of the bactericidal influence of this substance upon tubercle bacilli.

Reactions of the Tuberculous Organism Immune to the Shock.

As has been pointed out above, animals with a more chronic tuberculosis very often show a high immunity to shock, and the same is true with certain tuberculous human beings. These animals or patients tolerate the sanocrysin injection without getting any albuminuria or other signs of the shock.

The tuberculous organism, whether naturally immune or made immune by serum, gives very pronounced reactions to sanocrysin, but of another very different type. None of the features of shock appear, but we find instead all the symptoms belonging to the second group mentioned above —the "tuberculous reactions." The most obvious of them are the following: rise in temperature, exanthemata, loss in weight, faintness, and intestinal disturbances. Besides them focal reactions in the infected organs are observed with more or less regularity, as happens with tuberculin injections.

There is no space to consider here all the details of these reactions; they have been investigated to a very large extent by the clinicians, who have proved a striking similarity in all principal points between the experimental and the clinical observations. For details I must refer readers to the preliminary report on results from Danish clinics (Holger Moellgaard, *Chemotherapy of Tuberculosis*, Copenhagen, 1924), and to later publications.

Loss of Reactions during Treatment.

One important feature of all the reactions mentioned must be emphasized: they all disappear gradually as the clinical signs of the disease disappear. This fact is very interesting, because it is just what might be expected if sanocrysin is really able to cure tuberculous disease. To do this the substance must be able to transform the tuberculous organism from a condition in which it gives a severe reaction into a condition in which it gives no reaction to the substance itself, as is the case with the healthy animal. The fact that this transformation is actually observed brings us nearer to the idea of a real cure of the disease. The cured tuberculous animal tolerates sanocrysin without getting albuminuria, temperature reactions, loss in weight, exanthemata, focal reactions, or intestinal disturbances.

On the other hand, the pathological conditions in tuberculosis are so complicated that the loss of all reactions to sanocrysin is no decisive proof of a real cure. From the animal experiments we already know that the condition of failing reactions to sanocrysin means one of three things:

1. Sterilization until negative result of the guinea-pig test.
2. Total immunity with loss of Pirquet reaction, but without sterilization.
3. Simple failure of reactions because the rest of the bacilli are too protected by fibrous tissue or lime; in these cases the Pirquet reaction persists.

Whether there is a fourth possibility—that of a gold-fastness of the bacilli—we do not know at present. If such a condition exists it seems, however, to be temporary only, but further investigations are urgently needed.

From clinical experience in man we know already the last two conditions. To prove the first is, for valid reasons, beyond the reach of clinical observation at this early stage of our observations. Personally I doubt whether it will ever be possible to prove it clinically.

Before their total disappearance the reactions to sanocrysin are ordinarily delayed until two or three days after injection. The transitory stage between the disappearance of the clinical signs of tuberculosis in the lungs and the definite loss of reactions is marked by "late reactions." This phenomenon is very interesting, because its appearance is in close accordance with the power of sanocrysin to remain for four days in the organism and to diffuse through animal membranes. The late reactions may be explained on the assumption that most of the bacilli have been cleared out, and those remaining are better protected; the substance, therefore, takes longer to reach the bacilli by diffusion.

This observation has a very important bearing on clinical trials. In experiments the late reaction has been found only in the last stages of the cure. Where, however, the bacilli are well protected by fibrous tissue (a condition present in many cases of chronic tuberculosis met with clinically), such reactions are to be expected from the beginning of the treatment. Clinical experience has shown that "late reactions" two to four days after a sanocrysin injection very often occur.

For the clinician it is of great importance to know that even big reactions may occur as late as four days after one sanocrysin injection, because it tells him that if he injects a fresh dose within this interval he may bring upon his patient the risk of a cumulative effect of the liberated toxins. If there are no special indications which make a more intensive treatment necessary the interval between two injections of 2 cg. of sanocrysin per kilo of body weight should never be shorter than four days. For the same reason it is not right to inject a fresh dose of sanocrysin during the temperature reaction produced by a previous injection.

D. Curative Results.

The general results of the animal experiments hitherto made may be summarized as follows: The combined sanocrysin-serum treatment has saved the life of even very gravely infected goats, calves, and monkeys, and brought them into a condition of clinical healing. On the other hand, it appears evident from the experiments that a thorough sterilization of the affected organs is very difficult and probably very seldom secured in cases of grave infections. In four lighter cases and in one grave case I have been able to carry the cure through until the guinea-pig test was negative. In all other experiments the guinea-pig test has been positive, though the tuberculosis was reduced to a few calcified tubercles in the lungs and sclerotic processes in the bronchial glands.

In considering the clinical bearing of these observations it must be strongly emphasized that the curative results in the animal experiments have been secured mostly in cases of exudative pneumonic type of tuberculosis of the lungs. I have chosen this type in order to avoid the well known variations of the chronic type, which are very disturbing in experimental work. But by choosing this type I have, strictly speaking, limited the proof of the curative effect of the sanocrysin to exudative pneumonic tuberculosis in the lungs. Further, the results of the guinea-pig test in my experiments suggest that the possibility of achieving sterilization depends to some extent on whether the disease has progressed as far as caseous destruction or not. In the cases where the tests have given negative results the *post-mortem* examination showed no tubercles or only very few. In all cases where a larger amount of bigger tubercles were found, even though they were calcified, the guinea-pig test gave positive results.

It must therefore be expected that the best effect of the sanocrysin-serum treatment in the human subject will be obtained in cases of the exudative pneumonic type. Clinical experience seems already to show that this consideration comprises a true idea, the most striking clinical results having been secured in exudative cases. As, however, our present treatment, inclusive of artificial pneumothorax, fails to give definite results in very many of these cases, the attempt to found a chemotherapy on sanocrysin would not have been in vain, even if it should be limited to such cases.

On the other hand, the experiments have demonstrated that it is possible in a short time to cause typical productive [*sic*] tuberculosis[1] in its earliest stages to heal up with sclerosis and calcification, and clinical experience has shown that cases of acute extensive miliary tuberculosis of the lungs can be brought into a condition of clinical healing. Even though the effect is greatest in the exudative cases, there might be some good results in the more productive cases also. Besides, clinical tuberculosis, as is well known, very seldom provides a pure case of one type of affection. In most cases there will be found productive and exudative processes together, and the sanocrysin will then have a great mission in checking the exudative progressive processes.

As was to be expected, the extent and gravity of the tuberculous process set a certain limit for the success of the sanocrysin treatment In experiments on calves and goats this limit has been found with an initial infection exceeding 7 cg. tubercle bacilli per 100 kg. live weight of the cultures I have employed. I have only been able to carry one case with an initial infection of 10 cg. through until clinical healing. In the other cases the cure was inhibited by a rapidly developing cachexia, when big doses of sanocrysin were employed, and in cases of small doses the process could not be stopped: there were too many bacilli. It must, however, be understood that this limit is not decisive but dependent on the virulence of the cultures employed, when the treatment begins at the same time after the date of infection.

Finally, animal experiments have shown that other diseases in the lungs (mixed infections) may render it very difficult to obtain a curative effect with sanocrysin because the other processes themselves progress or protect the tubercle bacilli against the substance by enclosing them in large sclerotic masses of destroyed tissue. This has been observed in goats gravely infected in both lungs with *Strongylus capillaris* as well as with tuberculosis.

E. The Fate of the Tubercle Bacilli in the Tissue and the Alterations of the Tuberculous Lesions.

In three cases I have examined the lungs of calves after two to four weeks' sanocrysin-serum treatment. In all cases microscopical examination of preparations stained by the Ziehl-Neelsen method showed, particularly in small remaining miliary tubercles and their surroundings, numerous acid-fast granulations mixed with curled acid-fast and grey non-acid-fast bacilli. Amongst them were often found some acid-fast bacilli with normal morphology, and, as a transitory stage between the normal bacilli and the free granules, chains of granulations in the tissue. The granules were almost all intracellular. Probably these phenomena are indicative of the way the bacilli are cleared out of the tissue under the treatment. At any rate, these alterations of the bacilli in the tissue are, in my opinion, very remarkable.

The influence of the treatment on the anatomical lesions in the tuberculous organs may, it will be understood, vary according to whether the disease has been checked before the development of caseous tubercles or not. Where the process has been treated in the pneumonic exudative stage the only residuals of the process found on microscopical examination seem to be obliterated capillaries and small vessels and some infiltrations of the alveolar walls, which, however, are also found in lungs of quite normal calves.

Where real miliary tubercles and bigger caseous tubercles have developed, we have found the same alterations as are ordinarily observed when the tuberculous process heals spontaneously—namely, sclerosis and calcification. The most interesting observation has been that miliary tubercles may be grown through with fibrous tissue and contain a stone-hard piece of lime after four and a half to ten weeks' treatment. Bigger caseous tubercles have often in a very short time (five weeks) become surrounded by thick fibrous walls, and more or less filled with pieces of lime.

These results seem to prove that the sanocrysin treatment really exercises such influence on the bacilli in the tissue and on the tuberculous lesions as might be expected from the clinical observations of its curative influence on the tuberculous processes.

[1] The reader is referred to a note on page 668.

REGIONAL ANAESTHESIA:

*AN ESTIMATE OF ITS PLACE IN PRACTICE.**

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WHAT follows is based on my personal experience, on the observation of several hundred cases, and on the examination of the records of many more cases in which regional anaesthesia was administered in the Mayo Clinic during November and December, 1924, and January, 1925. No attempt is made to treat the subject systematically and as a whole; for such, the treatises of Labat, Braun, Meeker, Gwathmey, and others may be consulted. It is intended here to describe in essential detail those applications of regional anaesthesia which, beyond reasonable doubt, relieve the patient and assist surgical practice.

Preparation of the Patient.

An aperient is administered the night before, followed by a sleeping draught. An enema is given in the morning, and a light meal of tea and toast four hours before going to the operating room. Half an hour before operation, unless a head case, the patient receives from 0.16 to 0.25 grain of morphine, combined in abdominal cases with 0.01 grain of atropine to reduce the liability to nausea. The skin in the area to be injected is treated as for any surgical operation. Preliminary cleansing with benzene and ether is followed by painting with 2 per cent. tincture of iodine. The area is then draped with a single layer of towels, through which the bony landmarks are easily felt. It is an aid to place these towels at definite levels; for example, in a dorsal exposure of the patient, the upper edge of the lower towel should be at the level of the iliac crests, and the lower edge of the upper towel at the level of a selected vertebral spine. If the patient is exposed ventrally, the umbilicus, xyphoid, and pubis are useful levels for the edges of the towels. The lateral towels are best placed at the outer edges of the recti.

Preparation of Anaesthetic and Instruments.

Novocain (Metz) was used throughout the present series of cases. The solution was prepared as follows:

Four hundred c.cm. of sterile 0.9 per cent. sodium chloride were brought to the boiling point in a flask previously boiled for fifteen minutes; 75 grains of novocain were added and the whole gently boiled for three minutes, after which the mixture was diluted with freshly boiled sterile sodium chloride solution to 500 c.cm. This gave a 1 per cent. solution. At the last possible moment before injecting, 0.1 per cent. adrenaline was added in the proportion of 10 minims (not drops) to each 100 c.cm. of the novocain solution.

The glass syringe is graduated for 10 c.cm. and holds an additional 3 c.cm. to admit of aspiration.

It has metal ends, of which the proximal screws on, a metal plunger, and an eccentric nozzle with bayonet catch for the needle. To ensure an accurate fit of plunger and needle, the design of Labat, by Ateliers Gentille of Paris or Sharp and Smith of Chicago, was chosen. The needles are of non-corrosive steel, made as long as compatible with their tensile strength, and of varying size. A useful outfit would include five needles of 50 mm., three of 80 mm., three of 100 mm., three of 120 mm., and several 20 mm. dermal wheal needles. Each of these holds a stilette and is itself held in a metal tube container. There is needed also for caudal anaesthesia an 80 mm. steel spinal needle with a stilette, the end of which accurately fits the end of the needle. At the proximal end of the stilette is a slot and button to show where the bevel of the needle and stilette coincide. The cutting end should be refreshed with a carborundum hone before sterilizing. With the left index finger almost over the point of the needle to press it on the hone, and the proximal end between the right finger and thumb, the point is moved not more than 1 cm. back and forth, the needle making an angle with the hone of not more than 10 degrees. This results in a long narrow bevel which will pierce the skin with a minimum of trauma and pain. The needles are sterilized by boiling in water for three minutes with stilettes in place. The syringe is kept in an alcoholic solution of phenol and rinsed with sterile water before using.

ANAESTHESIA IN THE PELVIC AREA.

There is no area of the body in which regional anaesthesia is of greater value, or easier of application, than in the pelvis. The anaesthetic is applied to the sacral nerves outside the spinal dura mater. The needle is inserted through the hiatus sacralis for caudal anaesthesia, or through the posterior sacral foramina for transsacral anaesthesia. The anaesthetic may be introduced into both hiatus and foramina in the same patient. This may be called sacral anaesthesia. When the fluid is introduced into the hiatus, anaesthesia may be depended on up to and including the third sacral nerve in all cases. Usually it will include also the first and second sacral nerves. If the fluid is introduced into the third and fourth sacral foramina as well, anaesthesia is prolonged. If introduced into the first and second sacral foramina, then the first and second sacral nerves will certainly be affected. For external haemorrhoids, anal tags, fissures, and fistulas, caudal anaesthesia is adequate. For more extensive pelvic operations, such as prostatectomy or rectal excision, complete sacral anaesthesia is necessary. No further discomfort is caused the patient, since there is already some anaesthetic about the sacral foramina as a result of the fluid introduced through the hiatus. Such sacral anaesthesia admits the freest of pelvic manipulation. There are two limitations: the peritoneum remains sensitive to traction, and approach to the pelvis is confined to the perineal route. The pelvic peritoneum, however, lies in the field of anaesthesia, so that low rectal resection can be performed under sacral anaesthesia, with little or no discomfort, by the perineal route. Since an abdominal field-block permits of the suprapubic approach to the prostate, it follows that sacral anaesthesia, together with an abdominal field-block, will allow of the performance of suprapubic prostatectomy. This anaesthesia, indeed, has been found ideal for prostatectomy. There is complete loss of sensation, with rarely the fall in blood pressure associated with spinal anaesthesia, or the respiratory embarrassment met with in inhalation anaesthesia.

Method.

The patient lies prone on the operating table with a bolster under the hips to elevate the sacrum and buttocks. The draped towels leave uncovered an area from the first lumbar vertebra to the tip of the coccyx, and about as wide as it is long. A small wheal is raised one fingerbreadth above the upper end of the natal furrow. A 50 mm. needle is inserted through the wheal at an angle of about 60 degrees. After it has been passed about 3 or 4 mm. it will be felt to pierce a membrane (the posterior sacro-coccygeal ligament). There is a momentary resistance; then the needle goes quickly for 1 mm. and comes to a stop as it hits the sacral body on the floor of the hiatus sacralis. If it strikes a bone without that preliminary feeling of piercing a membrane and traversing a space, it must be withdrawn until the point is just below the skin and another attempt made. As soon as the point is in the sacral canal, 5 c.cm. of 1 per cent. novocain (in rectal cases 10 c.cm.) are slowly injected. Should subcutaneous oedema occur, the sacro-coccygeal ligament has not yet been pierced, and these steps must be retraced. As soon as the manœuvre is completed, the original needle is replaced by a steel spinal needle with stilette. If it sticks, it is rotated through 180 degrees. If it is felt grating against bone, it is moved forward or back until the grating sensation disappears. At the end of the manœuvre, three-fourths of the needle should be in the canal, and there should be no grating sensation on moving it forward or back 1 mm. A grating sensation means that the point is near bone, and is probably in a vein. If, on aspiration, blood or cerebro-spinal fluid enters the syringe, the stilette must be replaced and the needle moved slightly forward or back until subsequent aspiration is negative. The aim is to bring the point of the needle into the centre of the sacral lumen away from the bony walls and outside the dura.

* Work done in the Section on Regional Anaesthesia, Mayo Clinic, under the direction of Dr. J. S. Lundy. Submitted for publication January 19th, 1925.

When the needle is clearly in place, the anaesthetic is slowly injected up to 45 c.cm. if the patient weighs less than 154 lb. (70 kg.), or 55 c.cm. if he weighs 168 lb. (76 kg.). A reaction may take the form of pallor, sweating, nausea, or a rise of the pulse above 120 or a fall below 60, and demands a pause until it subsides. Anaesthesia of the perineum commences in from five to twenty minutes, and the field gradually increases. If it has not begun in half an hour, the suspicion will arise that the needle has not reached the caudal canal. There should be a well marked deepening of respiration, usually apparent after only 1 or 2 c.cm. has been injected. The absence of this deepened respiration will excite strong suspicion that the needle is not in the canal, and it may be well, then and there, to withdraw and reinsert it.

This is for simple caudal anaesthesia. If complete sacral anaesthesia is desired, caudal anaesthesia is first administered, but only 30 or 35 c.cm. are injected. The needle with stilette inserted is then left *in situ*. After a pause of several minutes to allow caudal anaesthesia to extend, transsacral is begun. The posterior superior iliac spine is the starting point. In a fat person there will be a dimple here, in a thin person a bony prominence. At a point 1 cm. internal to this and 0.5 cm. below it a wheal is raised with the small dermal needle. This is over the site of the second sacral foramen. Labat places this foramen 1 cm. below the interspinous line, while Meeker and Scholl find it 2.5 cm. medial to the spine and 1 cm. below. The line from this point to another 1 cm. external to the point of entry of the caudal needle (still left *in situ*) marks the row of foramina. Both Labat and Meeker insist that the sacral cornu offers the most constant relationship to the lower end of this line. The line is divided into three equal parts, and a dermal wheal placed at the juncture of the first and second, and second and third parts, marking the sites of the third and fourth sacral foramina respectively. An 80 mm. needle, or in a thin person a 50 mm. needle, may be inserted at right angles to the skin, through each of the above three wheals, into the corresponding second, third, and fourth posterior sacral foramina. When it enters, if in the exact axis of the foramen, there is a feeling of absence of resistance. If this sensation is not experienced, another attempt must be made. If failure attends the third trial, another foramen should be tried. Each one successfully located assists the determination of the others. The position of the first sacral foramen is determined by producing upward a line connecting the three wheals already made, and taking on it a point as far above the second foramen as this foramen is above the third. The foramina of the other side are next injected in the same way. Into each of the first sacral foramina should be injected 5 c.cm. of the 1 per cent. novocain solution; into each of the second, 4 c.cm.; into each of the third, 3 c.cm.; and into each of the fourth, 2 c.cm. It is best to start injecting the fourth sacral foramen first, then the third and second, since the anaesthesia due to the caudal injection will act at the lower end of the sacrum sooner than at the upper. In this way many patients go through the transsacral injections without pain. If there is pain on raising the transsacral wheals, a little delay will allow the caudal injection to act further. At the close of the transsacral injection, if the patient shows no reaction to the novocain and adrenaline, a further 10 or 20 c.cm. may be injected through the caudal needle, which remains in place throughout the administration. In a few minutes the patient's readiness for operation will be shown by insensibility to a pin prick in the median line of the perineum, and loss of the anal sphincter reflex.

Nomenclature.

The cases classified as "good" were all that could reasonably be desired. Those classified as "poor" were failures, and supplementary anaesthesia was required. In those classified as "fair" anaesthesia was adequate, but in some respect lacked reasonable perfection. Those classified as "intended combined" included mostly cases in which patients were nervous and the desirability of a little comforting anaesthetic at some stage had been anticipated. The class "necessarily combined" comprised not only cases in which regional anaesthesia failed, but those in which, for a variety of reasons, such as the discomfort of the table, failure of the patient's co-operation, or unexpected enlargement of the field of operation, eventually required a general anaesthetic.

There were 312 cases in which the anaesthetic was given. The results in 261 (83.7 per cent.) were good; in 25 (8 per cent.) poor; in 11 (3.5 per cent.) fair; in 5 (1.6 per cent.) "intended combined"; in 10 (3.2 per cent.) "necessarily combined"; and in 22 (7 per cent.) there were reactions.

Sacral Anaesthesia combined with Abdominal Field-block.

Sacral anaesthesia renders the perineum insensitive, but is obviously inadequate if the pelvis is to be reached through the abdominal wall, as is the case in a suprapubic prostatectomy. In this case an abdominal field-block is added as soon as the complete sacral anaesthesia has been induced. The patient is turned over on his back and a dermal wheal raised at the outer border of each rectus, half-way between the umbilicus and the symphysis. Through one of these wheals there is inserted an 80 mm. needle with syringe attached, containing 0.5 per cent. novocain with 10 minims of adrenaline to each 100 c.cm. It is carried, immediately below the skin, to a point just below the umbilicus, and a dermal wheal raised from underneath the skin. It is now withdrawn so that the point lies just under the skin where first introduced, and reinserted in the same direction as before, but at an angle to the skin of 30 degrees. No solution need be injected during the movement of reinsertion. It will be felt to pierce the anterior layer of the rectus sheath, and at this point 3 c.cm. are injected between the layers of the rectus sheath. The terminal branches of the tenth, eleventh, and twelfth dorsal and first lumbar nerves lie in this region. The needle is again drawn back and redirected forward, this time at an angle of 60 degrees to the skin, and another 3 or 4 c.cm. introduced after the needle is felt to pierce the anterior rectus sheath. The manœuvre is repeated at an angle of 80 degrees, by which time the syringe will be empty. In just the same way a syringeful is injected from the same wheal toward the superior pubic ramus. A repetition of these injections on the other side blocks off a gable-shaped space through which entry into the bladder is made. Lastly, a 50 mm. needle is introduced just behind and to one side of the symphysis, until it is felt to impinge on the pubic bone. It is slightly withdrawn and redirected downward behind the pubis into the cave of Retzius, where 10 c.cm. are injected on each side. By this time anaesthesia of the gable-shaped space should be complete. If not, reinforcing injections may be given in the same areas.

There were 134 cases in which the anaesthetic was given. The results in 118 (88.1 per cent.) were good; in 5 (3.7 per cent.) poor; in 8 (6 per cent.) fair; in 2 (1.5 per cent.) "intended combined"; in 1 (0.75 per cent.) "necessarily combined"; and in 19 (14.2 per cent.) there were reactions.

Regional Anaesthesia of the Neck.

Its chief application in this area is in thyroid operations, but it is applied with equal success in block dissection of glands, excision of a thyro-glossal duct, or, as in one case in the present series, cervical sympathectomy for angina pectoris. The object is to bathe the cervical plexus in anaesthetic. The head being turned to one side, a dermal wheal is raised just below the mastoid and another over the cervical transverse processes, at the level of the superior cornu of the thyroid cartilage. Through the first wheal a 50 mm. needle is introduced, and directed medially, slightly downward and slightly backward. The course of the needle can be visualized more clearly if the tip of the left forefinger is placed on the third or fourth cervical transverse process, and held parallel to the direction decided on. When the needle is felt to touch the tip of the second cervical transverse process, it will be found that it slides off the tip readily in any direction. With it in contact with the tip, 10 c.cm. of 1 per cent. novocain and adrenaline are injected. Similarly a 50 mm. needle is introduced at the level of the

superior thyroid cornu over the fourth cervical transverse process, and another 10 c.cm. introduced. It is important to direct the needle downward so that it hits the transverse process in an oblique direction. If it is directed transversely there is a danger of wounding the vertebral artery or spinal dura, as Meeker pointed out. The head is turned to the other side, and two injections of 10 c.cm. given as before. The preceding constitutes a deep bilateral cervical block. An 80 mm. needle is now introduced through the wheal below the mastoid, pushed subcutaneously along the posterior border of the sterno-mastoid muscle, and 10 c.cm. of 0.5 per cent. novocain injected along its middle third. This blocks those nerves that become superficial at that point—namely, the great auricular, the small occipital, and the transverse cervical. The anaesthesia induced is almost instantaneous, and lasts two or two and a half hours. No adrenaline is added to the novocain solution if the condition is a toxic goitre.

There were 106 cases in which cervical anaesthesia was induced. The results in 83 (78.3 per cent.) were good; in 6 (5.7 per cent.) poor; in 10 (9.4 per cent.) fair. In 2 cases (1.9 per cent.) the anaesthetic was "intended combined"; in 5 (4.7 per cent.) "necessarily combined"; in 5 (4.7 per cent.) there were reactions.

INGUINAL HERNIA.

After complete reduction of the hernia, a wheal is raised in a line from the anterior superior spine to the umbilicus, at a distance of three fingerbreadths from the anterior superior spine. A 50 mm. needle is inserted toward the umbilicus subcutaneously. When it has been introduced almost its entire length a wheal is raised, 0.5 per cent. novocain and adrenaline being used. The needle is now withdrawn to the first wheal, and pushed forward at an angle of 30 degrees to the skin. At the moment when it is felt to pierce the anterior rectus sheath, 2 c.cm. are injected. The manœuvre is repeated at angles of 60, 75, and 90 degrees to the skin. The 50 mm. needle is now completely withdrawn, the syringe refilled and reinserted through the wheal previously raised at the extremity of the needle's first subcutaneous insertion. Through this wheal solution is injected just as before, under the anterior rectus sheath as far as the umbilicus. The needle is again completely withdrawn and reinserted through the first wheal. This time injections are made toward the anterior superior spine, after each 2 or 3 c.cm. injection, increasing the angle the needle makes with the skin, until finally it is at right angles to it. Each injection of 2 or 3 c.cm. is made after the point is felt to pierce the external oblique aponeurosis. As a result the ilio-hypogastric and ilio-inguinal nerves will be completely blocked. A wheal is now raised over the superficial abdominal ring, at about the point where its pillars meet. The cord being raised from its bed is injected with a 50 mm. needle inserted through the wheal, 10 c.cm. of 0.5 per cent. novocain being used. The cord will be felt to swell as a result. Lastly, the 50 mm. needle is reinserted through this wheal between the cord and median line, and 10 c.cm. of novocain injected deep into the cord at its emergence from the superficial abdominal ring. In from five to fifteen minutes there is a complete anaesthesia of the surgical field, excepting the neck of the sac, and a duration of the anaesthesia of one hour may be expected. The neck of the sac is injected when the external oblique aponeurosis has been divided. It is quite possible to inject it before operation, but not without unnecessary risk.

There were 38 cases of inguinal hernia. The results in 27 (71.1 per cent.) were good; in 3 (7.9 per cent.) poor; in 3 (7.9 per cent.) fair; in 1 (2.6 per cent.) "intended combined"; and in 4 (10.5 per cent.) "necessarily combined."

LAMINECTOMY.

Regional anaesthesia is of great value in this operation. The position of the patient renders the administration of a general anaesthetic difficult. The operation is usually a lengthy one and the patient a poor subject for such prolonged inhalation anaesthesia. Under regional paravertebral anaesthesia the shock, as measured by blood pressure and pulse, is slight. In the Mayo Clinic the results with regional anaesthesia have been better than with nitrous oxide or ether. The patient lies prone with the table angulated at his waist, the apex of the angle pointing upwards. His head rests on a horseshoe rest, through which he looks towards the floor. If laminectomy of the seventh dorsal vertebra were to be performed, paravertebral anaesthesia would be induced from the third to the tenth dorsal spine. A dermal wheal is raised 3 cm. to the right of the third spine, and an 80 mm. needle introduced at right angles to the skin. The resistance it encounters is the transverse process of the fourth dorsal vertebra. It is now withdrawn a little and pointed upward until it has passed the transverse process a distance of 1 cm. It will now touch the third dorsal nerve, and paraesthesia at this stage, while not sought intentionally, means later deep anaesthesia. An injection of 4 c.cm. of 1 per cent. novocain and adrenaline is made at this point. The manœuvre is repeated on the other side of the third spine. In the same way each pair of dorsal nerves is injected, down to the tenth. It is often necessary to wait forty-five minutes before anaesthesia is complete. The process is hastened, and in unfavourable cases made more successful, by infiltrating the post-vertebral muscles with 0.5 per cent. novocain. Experience has shown that infiltration of these muscles alone is often unsuccessful. The area is tendinous and the solution does not run. A combination of paravertebral anaesthesia followed by infiltration shows far better results than either method used alone. As much as 200 c.cm. of 1 per cent. novocain with 100 c.cm. of the 0.5 per cent. solution may be given. In this, as in all regional anaesthesias, the ideal amount of anaesthetic is that which produces anaesthesia without a reaction. If the laminectomy is in the cervical region, then the nerves are best reached by the technique described for bilateral deep cervical block. If the laminectomy is in the sacral region, then the method employed is as detailed under the heading of sacral anaesthesia.

There are 25 cases in which regional anaesthesia in laminectomy was induced. The results in 17 were good; in 4 poor; in 2 fair; in 2 the anaesthesia was "necessarily combined"; 1 showed reaction.

CRANIAL EXPLORATIONS.

When craniotomy through the occipital bone is to be performed, a lateral deep cervical block is followed by a superficial cervical block at the posterior border of the sterno-mastoid, just as described for operations on the thyroid, except that 1 per cent. novocain is used for the superficial block. If anaesthesia does not develop quickly and completely, the neck is next infiltrated from the external occipital protuberance downward to the vertebra prominens, and the scalp along the superior curved line of the occiput, out to each mastoid. It is essential to infiltrate thoroughly, for not only does fluid run badly in the thick post-vertebral musculature, but the great occipital nerve at its origin as the posterior primary division of the second cervical nerve lies nearer to the median line than to the transverse process of the axis, and may be missed in the lateral deep cervical block, in which the pools of novocain are deposited at the tips of the transverse processes on the floor of the posterior triangle. From these pools the posterior primary division of the second cervical nerve is shielded by the complexus and splenius. The above technique gives an insensitive and bloodless field for the usual crossbow incision.

There were 4 cases in which regional anaesthesia was induced for posterior craniotomy. The results in 3 (75 per cent.) were good, and in 1 (25 per cent.) poor.

REGIONAL ANAESTHESIA IN THE ABDOMEN.

Little need be said on this subject. The question of the path of pain from abdominal viscera is not settled. Labat's technique is based on the theory that the splanchnic nerves provide the greater part of the route; Meeker has expressed himself very emphatically in disagreement. Moreover, that degree of success has not been attained with abdominal anaesthesia which would entitle it to a place among those

manœuvres which have been shown, beyond reasonable doubt, to be of real value. Discredit can only be brought on a rational method of anaesthesia by its too ardent application to a region to which it is very questionably suited.

A modification of Labat's method was used in 32 cases, with good results in 11. Of these, 4 were partial gastrectomies, 3 gastro-enterostomies, and 1 a choledochotomy. It is impossible to be sure, however, just how much of the result was due to the anaesthesia of the abdominal sympathetic nerves, which Labat's method induces.

The most important result of regional anaesthesia is demonstrated rather by experience than figures. It is that in almost all cases the patient is the better for his regional anaesthetic, and even if inhalation anaesthesia is also needed, the patient is held with a minimum of nitrous oxide or ethylene often sufficient only to abolish consciousness.

Reactions to Regional Anaesthesia.

These are easily induced unless strict watch is kept on the patient and the various signs noted. It was the rule in all the cases of the present series for a nurse to sit at the patient's head and record the pulse. In head, spinal cord, and abdominal cases she also took the blood pressure. All these were recorded on a sheet of paper which the administrator could see and so avoid alarming the patient by verbal inquiries. The nurse also engaged the patient in conversation and withdrew his attention from the manipulations.

A reaction may be due either to the adrenaline injected or to the novocain, or both. An adrenaline reaction is early, a novocain reaction late. The elements of an adrenaline reaction in the order of their appearance are: (1) increased respiration, (2) rapid pulse, (3) palpitation, (4) apprehensive excitement, (5) tremor, (6) sweating, (7) dyspnoea, and (8) precordial pain. The last two, unlike the others, are late in onset. Any three of the first six constitute a marked reaction; the last two are happily as rare as they are serious. The elements of a novocain reaction are those of spinal anaesthesia: slow pulse, fall in blood pressure, pallor, cyanosis, nausea, and vomiting.

The treatment for either type of reaction is that of prevention. Safety is ensured by slow injection and cessation as soon as the reaction appears. The effect wears off in a few minutes. It is not cumulative and injection may proceed after an interval. In the event of a severe adrenaline reaction, oxygen containing 5 per cent. of carbon dioxide is given. This relieves the air hunger and anginal pain. More than 30 minims of adrenaline should never be given to one patient. There was only one severe adrenaline reaction in the present series. That was in the case of a patient who was afterwards found to have a family history of capillary atonicity. Both blood pressure and pulse rate were abnormally low, and his type would now be considered unsuitable for regional anaesthesia.

An ampoule containing 3 grains of caffeine, 7 grains of sodium benzoate, and 0.025 grain of strychnine should be in readiness in the event of a severe novocain reaction. For severe cases of pallor, nausea, and slow pulse, from 5 to 10 minims of adrenaline are injected.

A certain measure of success may be attained by practice of the technical methods herein detailed. To improve on that and to reduce failure to a minimum, careful study of the anatomy of the region is essential. It is necessary to visualize the field in perspective, and to be prepared for those variations from normal topography and relations which are not to be dealt with by rule of thumb.

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NODAL FEVER.

(*ERYTHEMA NODOSUM, ERYTHEMA MULTIFORME.*)

BY

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Preliminary.

In 1905 I published a book which bore the title *Nodal Fever*; quite recently Dr. G. F. Walker of Leeds has asked for my present views on this subject, and I will here sum up the results of further observations made during the past two decades. With respect to my *parvum opus* I may mention that, although the criticisms were very complimentary and friendly, the general verdict was the Scottish one of "Not proven."

Briefly stated, my contention was that erythema nodosum is not merely an affection of the skin, but an acute specific fever, met with, and best studied, in ordinary general practice. Evidence was adduced to show that it had a distinct prodromal stage, a stage of eruption, and a period of convalescence; that relapses occurred, and that second attacks had been noticed after an interval of several years. The theory advocated by Dr. (afterwards Sir) Stephen Mackenzie nearly forty years ago, that it is a manifestation of rheumatism, was combated; an explanation of the arthritic symptoms was suggested; and Trousseau's dictum that erythema nodosum is a distinct disease from erythema papulatum was disputed. Finally, I ventured to rename the disease "nodal fever" (febris nodosa).

My attention was first directed to this complaint when I graduated in 1879. I was attending at the time a brother, aged 16, whose attack as regards the copiousness of the rash, the degree of the accompanying pyrexia, and the prolongation of convalescence, was as severe as any I have ever seen since; it was something very different from the mild cases I had observed in hospital out-patient practice. I settled in Adelaide in 1883, and during the next seven years met with thirteen more cases. In 1886 I was struck by the coincidence of two cases of erythema nodosum occurring in the same household at the same time, but did not regard it as more than a coincidence. In the following year I had a child, aged 4 years, under my care for several days with a mild feverish attack, and had suspected typhoid fever because of its prevalence at that time; when it turned out to be erythema nodosum, the resemblance of this prolonged period of malaise and pyrexia to the ordinary prodromal stage of many of the acute specific fevers immediately struck me, and the chain of evidence seemed fairly complete. These observations were confirmed in subsequent cases, and in 1890 I wrote a paper[1] entitled "Erythema nodosum, an acute specific fever." The volume *Nodal Fever*, based upon 63 cases, appeared fifteen years later, and was merely an elaboration of my former paper.

In this present communication it is proposed to deal with the subject by showing the general resemblance the symptoms and course of nodal fever bear to other acute specific fevers, by bringing forward fresh evidence pointing to its infectious nature, and by discussing its suggested relationship to other diseases, and the views thereon of other writers.

Statistics.

The first point to which I would draw attention is the age incidence (excluding cases seen in the Children's Hospital); there were—

Under 10 years ...				...	...	...	...	13
Over 10 and under 20 years				...	...	...	...	34
,, 20	,,	30	,,	...	...	...	...	30
,, 30	,,	40	,,	...	...	...	...	13
,, 40	,,	50	,,	...	...	...	...	3
,, 50	,,	60	,,	...	...	...	...	2
,, 60 years ...				...	...	...	...	1
								96

Roughly speaking, 94 per cent. were under the age of 40 years and 6 per cent. over that age. If we accept 14 years as the average age of puberty in both sexes, and

48 as the approximate date of the climacteric in woman, we find the cases grouped as follows:

Under the age of puberty...	27
Between puberty and the climacteric	66
After the climacteric	3
	96

The youngest patient was 2½ years of age, the oldest was 69.

The influence of sex combined with age is interesting: taking all cases I find—

Under the age of puberty, 18 males, 17 females.
Over " " 4 " 85 "

22 males, 102 females = 124.

The influence of season is very slight.

In the first quarter of the year there were ...	29
" second " " " ...	25
" third " " " ...	30
" fourth " " " ...	34
	118

As regards social state, of those who had attained their majority 38 were single and 18 married. Of 46 adult women the majority were engaged in domestic occupations, but 7 were hospital nurses, and 7 were school teachers, whilst one man and one girl were medical students, and another male was a teacher.

SYMPTOMS AND COURSE.

Instead of describing a series of individual cases I shall attempt to draw a composite picture of the complaint, dealing separately with the prodromal, the eruptive, and the convalescent stages. I must premise, however, that cases are met with of varying degrees of severity as regards the general symptoms and the extent of the eruption, as well as of the accompanying pyrexia.

Prodromal Stage.

It is not unusual for medical advice to be sought in this stage, when one may meet with most of the ordinary symptoms comprised under the term "malaise," such as headache, shivers, and temperatures ranging as high as 103°; pains in the limbs and joints, stiffness, or a tired feeling as though the limbs were of no use; one patient felt as if she had walked miles. In about 16 per cent. of cases a sore throat is mentioned as an early symptom, but the objective signs in the throat are very slight; at other times there is a complaint of naso-pharyngeal or tracheo-bronchial catarrh; more rarely disturbances of the alimentary canal attract attention. A correct diagnosis at this stage is seldom possible, unless amongst the other symptoms ocular phlyctenulae are noticed; in two such instances[2] I did prophesy that erythema nodosum would appear, and my prophecy turned out to be correct; on one or two other occasions, even without the presence of this valuable sign, I have suggested nodal fever as a possible diagnosis when no adequate explanation could be found for the prolonged high temperature, and I have been justified by the event. It will illustrate better, I think, the puzzling nature of the prodromal symptoms if I enumerate some of the various suspicions that have been aroused—rheumatic fever, enteric fever, influenza, tuberculous meningitis, hepatitis; these are some of the "shots" at diagnosis made, not by the patient's friends, but by the medical attendant.

The duration of this prodromal stage when well marked, as it was in a third of my second series of cases, appears to average about twelve days, and its extreme limits to range from seven to seventeen days, as far as I can judge. This corresponds very closely with my previous estimate in 1904. A very distinct feature of the prodromal stage is an exacerbation of the symptoms on the third or fourth day preceding the appearance of the rash; this was noticeable in 40 per cent. of my second series. The incubation period, moreover, is occasionally preceded by a considerable period of vague ill health, extending over some weeks or even months, and demanding treatment. The only inference one could venture to draw is that debility, attended with dyspepsia and anaemia, may possibly render the sufferer more vulnerable to an attack of nodal fever; on the other hand, other patients seem to have contracted it when in robust general health.

Stage of Eruption.

The question of diagnosis is seldom likely to occur in this stage. The individual spots of erythema nodosum on the shins are easily recognized, and I have been careful to exclude cases of erythema papulatum or erythema multiforme which failed to show at least one typical node on the legs. In a patient seen with Sir Joseph Verco in 1917, where no erythema nodosum or phlyctenulae could be found, there was an abundant rash of the appearance of erythema papulatum and erythema tuberculatum, together with diffuse blotches several square inches in area, but in this case an explanation was found in the fact that the patient was taking potassium bromide for epilepsy; the rash disappeared as soon as the drug was discontinued.

With respect to the appearance of the rash, I may say generally that the characteristic nodes, oval in shape, with their long axes more or less parallel to the limbs, and seldom or never transverse, are mainly seen on the legs. They used to be described as situated chiefly along the shins, but they have no special affinity for subcutaneous bony surfaces, and they may be seen just as much over the rest of the legs. To a less extent this oval shape may be noticed in nodes on the forearm, but elsewhere, round the knees for instance, the skin lesions are generally circular and may range from papules the size of peas to blotches two or three inches in diameter. Many of these spots seen apart from a genuine case of erythema nodosum would be described as erythema papulatum or erythema tuberculatum. I wish to stress this point because, whilst erythema nodosum may predominate, or appear alone, in a given case, the eruption in severe cases is usually a mixed one, and the rarer, though not very uncommon, appearance also of erythema iris, or erythema gyratum, establishes definitely, in my opinion, the multiform character of the nodal fever rash.

The manner in which these spots appear and fade into bruise-like swellings, lasting sometimes for five or six weeks, or even, faintly, for two or three months, need not be described, as it is so familiar; but I may emphasize the fact that the pain and tenderness associated with the spots may persist also for a long time, and that the lumps may be felt long after all colour has faded, whilst the pain and the purple tint may be revived by hanging down the limbs some time after these symptoms had apparently disappeared in the convalescent stage. I do not propose to dwell upon the appearance of the spots elsewhere than on the limbs, but the body, the face, and neck may all be attacked.

The duration of the eruption varies from a few days to some weeks. Besides the fading bruises, a crinkled skin and some desquamation may be noticed, but never suppuration or ulceration, though pustular spots of staphylococcal origin are sometimes accidentally associated. The spots may appear in relays, so that the eruption may be seen in all stages at the same time; or fresh spots may appear when the patient is convalescing, with intervals of from twelve to twenty-five days between the two crops; one lady reported from South Africa[3] that fresh spots had been constantly recurring for nearly a year.

As regards the general symptoms of the eruptive stage, one need only say that they are such as are usually associated with fever and the accompanying toxaemia, and that whilst usually they preserve some ratio of severity to the copiousness of the rash, they often seem less severe than during the prodromal stage.

Two special symptoms should be mentioned. One is somewhat rare, and I have termed it "Verco's sign," as it was first pointed out to me by Sir Joseph Verco in 1892.[4] It consists of subungual striae or dots of haemorrhage, and may be seen both on the hands and the feet; in my second series of cases I met with it five times—that is, about once in twelve cases. The other symptom is much more common, and consists of one or more phlyctenulae; they are seen on the ocular conjunctiva near the margin of the cornea like tiny spots, or pimples, with a leash of blood vessels like a comet's tail spreading out towards the periphery of the eyeball; generally they are seated over the insertions of the inner or outer recti, but similar spots may be seen on the palpebral conjunctiva near the tarsal edge. It has, as I have already mentioned, a diagnostic importance in the prodromal stage; from its frequency—it occurred in 40 per

cent. of my cases—it establishes itself as an integral part of the disease, and in my opinion is undoubtedly the manifestation of the rash on a mucous membrane. I have not seen a similar thing in the nose or mouth, but in a fatal case of erythema papulatum which I reported[5] there were spots of superficial ulceration in the mouth. If, then, lesions appear on the visible mucous membranes as well as upon the skin, it is not, I think, a far-fetched idea to suggest that the pain complained of in the joints in both the prodromal and the eruptive stages may be due to a "node" developing on synovial surfaces. Here I may mention a piece of evidence that true skin is not an essential basis for the appearance of nodes; for I have seen them on a wide scar over the knee where no true skin tissue appeared to be left. In three or four cases only the glands of the neck have been noticed to be enlarged.

Stage of Convalescence.

In this stage the chief features are the marked depression and debility, whilst a few have complained of "rheumatism" subsequently. In one case weakness of the limbs persisted for which massage was necessary some eight months after the illness; in an elderly lady the saphenous veins in both legs became plugged.

Second Attacks.

I have recorded[6] four cases of second attacks, and now I can add five more. The interval between the two attacks ranged from one to sixteen years, but the average was almost five years. One patient, a hospital nurse, had three definite attacks within two years. Two other instances of erythema nodosum were followed at intervals of twelve and eighteen years respectively by attacks of erythema papulatum in which no definite spot was discovered which by itself could be called erythema nodosum.

Ultimate History of Patients.

Amongst those who have since died one succumbed to an appendix operation, another died at 75 of apoplexy, and a third at 82 of mitral disease. Morbus coxae, pulmonary tuberculosis, tuberculous meningitis each claimed one victim, and another case succumbed to erythema papulatum. Of the rest, one was operated upon for exophthalmic goitre and one became insane (her mother and sister had committed suicide); in one girl, whose brother was invalided home from the war with phthisis, there is a suspicion of apical tuberculosis; two other patients are liable to a vague sort of rheumatism unattended with fever.

The Evidence of Infection.

I have previously reported[7] several examples of apparent infection conveyed from one patient to another, and now, with my additional cases, I have collected altogether ten such instances. In five of these two children in one family have been seen with the eruption coming out at intervals of from one to nine days, with an average of four days; such cases might be explained by the suggestion of a possible family predisposition, or of exposure to the same exciting cause at about the same time. Family predisposition cannot, in my opinion, be entirely ignored, because in one family I have notes of five grown-up young women contracting the disease at intervals of from one to seven years; four of them were sisters and the fifth a first cousin. Here the further question of a possible "carrier" comes in, and the fact of a patient being a carrier might explain the relapses and second attacks to which I have drawn attention; one of the sisters just mentioned had a second attack. As another instance of such possible family predisposition, or of "carrying" the germ, there is the case of Mrs. A., who had erythema nodosum as a girl of 16 soon after measles, and whose younger sister contracted both diseases almost at the same time; sixteen years later (1909) Mrs. A. had nodal fever again, and her two daughters, aged 14 and 12 years respectively, had it simultaneously in 1921. In another instance a mother was ill with nodal fever and confined to an upstairs room, whilst her grown-up son was laid up with a bubo on the ground floor; when sufficiently well the mother used to come downstairs and sit with her son; he exhibited the rash within a few days. A young woman, a domestic servant, was admitted into the Adelaide Hospital with the complaint on March 15th; a sister was admitted on March 29th; she had temporarily filled her sister's situation, though she had not slept in the same bed.

Apart from relatives, however, I have two instances that are quite striking. No case of nodal fever had been treated in the wards of the Adelaide Children's Hospital for eighteen months until May, 1899, when L. H. and H. D. were admitted on the 9th and 13th respectively. T. H. (no relation of L. H.) was admitted for other reasons on May 4th, and on June 10th he exhibited the rash. In 1909 a young girl was convalescent in the Adelaide Hospital from typhoid; she developed nodal fever, and two of the nurses in attendance on her contracted it, their incubation period being at least eight days.

Of epidemics of nodal fever I have had no personal experience. Six cases were noticed almost simultaneously at an outlying port in South Australia about thirty years ago. Besides the instances quoted by Dr. Odery Symes,[8] there is a legend of an outbreak on board a training ship just before the holidays commenced; several cadets, who had apparently escaped infection, had definite attacks after reaching home; this used to be quoted, I am informed,[9] by Dr. Lees. Moses quotes[10] an epidemic which occurred in Bosnia in 1857, and Wiborg[11] describes one in Norway in 1921-22, when he saw 30 cases in ten months, 18 of which occurred in December.

The Relationship to Other Diseases.

Other Forms of Erythema.

I should not, perhaps, have alluded once more to this branch of the subject were it not that I notice that Dr. Odery Symes,[8] in his last able contribution, has not fully made up his mind. Personally I had no doubt in 1890 that although Trousseau in his classic lectures[12] sought to distinguish between erythema nodosum and erythema papulatum, anyone reading his cases carefully must come to the conclusion that the difference was in degree, but not in kind, and that in fact he had unwittingly established their identity. In two severe instances of erythema papulatum occurring in my practice the patients had suffered from erythema nodosum many years previously, whilst associated with undoubted erythema nodosum I have seen at times not only erythema papulatum but every other variety that has been described—erythema tuberculatum, erythema iris, erythema gyratum. Again, in the few cases in which I could not demonstrate typical nodes on the legs, the same prodromata, the same high fever, the same arthritic and teno-synovial signs, the same long convalescence, have been noticed. There is nothing of which I am more strongly convinced than of the identity of these separate elements of erythema multiforme, whose differences are merely those of outward form; such compound cases, if one may so term them, are seen in children occasionally, though less frequently than in adults; in one very severe case of erythema multiforme the infection was traced to another child with the simplest form of erythema nodosum.

Into the question of the supposed relationship of nodal fever to rheumatism I went fully twenty years ago. I pointed out then that Sir Stephen Mackenzie's statistics[13] were not the result of personal observation, but were derived from the records of four London hospitals and compiled presumably by their medical registrars. I sent Sir Stephen a copy of *Nodal Fever* with a letter, but received no reply from him. In December, 1908, when travelling up the Nile, I was introduced to Sir Stephen at Assouan, where he often wintered. It was a most interesting and somewhat amusing meeting; he thought that he remembered my name, but I mentioned that I lived in Australia. "Ah, then," he said, "perhaps we have been in correspondence." When I explained that it required two to constitute a correspondence, and that he still owed me a letter, he immediately recalled the circumstance, and said that he had been intending to reply for more than eighteen months, and that he thought he had the answer amongst his luggage; however, he had not been able to find the document next day when he came down to the steamer to see me. Shortly after he died, and I was unable to procure any information as to the document.

Other writers meanwhile, whose opinion carries much

more weight than mine possibly could, and notably Dr. Odery Symes,[14] Dr. Maxwell Telling,[15] and Dr. Hope Gosse,[16] have gone into the matter carefully and arrived at much the same conclusion as myself. It therefore seems to me to be unnecessary to say more than this—that there are only three cases in my new series in which there is a history of previous rheumatic fever in the patient, and that in none of the three had any organic cardiac lesion persisted; that in four others there was a vague history of so-called rheumatism; and that in only five cases was there a family history of acute rheumatism. Again I wish to emphasize my conviction that the pseudo-rheumatism of nodal fever is an expression of arthritis or of teno-synovitis due directly to the "germ" which causes the skin eruption, or to the toxins to which it may give rise. Above all, I wish to reiterate the absolute uselessness of drugs of the salicylic acid group to ease these pains or to control the course of the disease.

Lastly, roughly speaking, there are no cardiac complications of nodal fever: a transient though distinct murmur may be noted during the illness, but it disappears; it is probably haemic or myocardial.

Tuberculosis.

When my book was published in 1905, in disputing the rheumatic theory which then held the field, I lightly said[17] that it would be just as easy to prove, as far as mere statistics were concerned, that nodal fever was related to tuberculosis. I little dreamt then how large the tuberculous theory of its origin would loom in the next twenty years, though it was broached originally over half a century ago, or that I should read the dogmatic assertion in a retrospect of the year 1918[18] that "the causative factor of erythema nodosum has now been determined to be tuberculosis." The subject, therefore, requires careful investigation. In this direction again I am forestalled by Dr. Symes, and I can only assert that the proportion of tuberculous manifestation preceding nodal fever is not greater in my experience than one would expect considering how widely spread tuberculosis is known to be, and that tuberculous sequelae are comparatively rare. In my whole series there are only two cases of nodal fever complicating tuberculosis—one a girl of 18 who had suffered since early childhood from morbus coxae, and a young married woman who was at the time suffering from, and who subsequently died of, phthisis. A mother, who had lost a son from tuberculous meningitis, died many years later from erythema papulatum, but without any evidence of being tuberculous herself.

Opinions of Other Writers.

Some writers[19] [20] have drawn attention to the fact that nodal fever occasionally follows shortly after measles, and I have notes of one such case. I can hardly think that there is any causal relationship, but the observation is one to be borne in mind.

There are many who still adhere to the rheumatic fever heresy (cf. references 21 to 27), but as a rule they only bring forward one or two isolated cases. Wiborg,[11] however, is an exception, as he recorded an epidemic of thirty cases which he considered to be of rheumatic rather than of tuberculous origin. Hallam[28] writes in opposition to the rheumatic theory.

Landouzy[29] excised a node and found in it Koch's bacillus; he inoculated a guinea-pig with a portion of this node and produced in the animal tuberculous lesions, but he does not himself contend that therefore all cases of erythema nodosum are tuberculous in origin. Ward[30] expresses similar views. Hildebrand[29] obtained with venous blood similar inoculation results. On the other hand, Otto Brian[29] induced tuberculosis in a guinea-pig in one experiment, but failed in all his others. His conclusion was that tuberculosis was the actual cause of erythema nodosum in only a few cases; Dufourt[31] put it as high as 60 per cent. Deléarde and Haller[32] also think that the greater number of cases arise from a tuberculous soil.

Intradermic injection of tuberculin is said[29] to have caused lesions exactly resembling erythema nodosum at the point of injection, but Dr. Darcy Cowan informs me that he can recall no case following hypodermic injection. Stefano[33] obtained a positive reaction in all the 23 cases in which he tried von Pirquet's test. Vetlesen[34] plumps for tuberculosis. Several writers have recorded[35] [36] [29] the fact of cases of erythema nodosum complicating tuberculosis and winding up with meningitis, and have verified their observations by necropsies. Haug[37] opines that the tubercle bacillus can provoke either erythema nodosum, or a form of arthritis which does not yield to sodium salicylate nor pass so quickly from joint to joint as usual. Meara and Goodridge[29] thought that erythema nodosum occurred under three conditions: (1) as a simple variety of erythema multiforme; (2) as a definite specific contagious disease; (3) as a lesion secondary to many things, such as infectious diseases, drug ingestion, alimentary disturbance, and nerve diseases.

Lastly, several writers have been impressed with the possible infectious and contagious nature of nodal fever. These include: Anderson and Cooper,[38] Clarke,[39] Craig,[40] Durante[41] (who excludes tuberculosis and rheumatism), Wendler,[42] Settgast[43] (who considers rheumatism a complication, not a cause, and excludes tuberculosis from consideration), Dorth,[44] and Moses.[10] Gueissaz[45] finds it to be an acute exanthem, and that marvellous observer Sir Jonathan Hutchinson[46] almost said the same thing more than half a century ago. Amongst English writers Odery Symes[8] bears me out in almost every respect, whilst Maxwell Telling[15] also considers it to be an acute specific disease, but does not agree with me, I fancy, as to its relationship to erythema multiforme.

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THE CHEMOTHERAPEUTIC TREATMENT OF GONORRHOEA AND ITS COMPLICATIONS.*

BY

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Introduction.

THOUGH gonorrhoea, when first contracted, is a local infection, nevertheless changes do occur in the blood of the host, particularly in the protein particles of the plasma in which resides the host's main protective substance. Treatment with chemical substances and protein extracts (vaccines) acts by increasing the patient's resistance and not by killing the invading micro-organisms directly. Considering that vaccine treatment alone leaves much to be desired, it has been my endeavour for some years past to find a chemical compound which would have much the same effect in gonorrhoea as has arsenobenzene in syphilis.

The last milestone in this work was marked by the introduction of manganese butyrate, a drug which has proved

* A post-graduate lecture given at the London Lock Hospital, February 10th, 1925.

of value, particularly in the acute complications of gonorrhoea. These are due, perhaps, more to the invasion of staphylococci than actually to the gonococci. In short, manganese butyrate has a better chemotherapeutic effect in pure staphylococcic than in pure gonococcic infections. As the gonococcus is higher in the scale of bacterial evolution than the staphylococcus, a drug more powerful than manganese butyrate is required to combat its invasion.

Metallic preparations appear to act by increasing the number of the protein particles constituting the defence, thereby augmenting the area exposed to the bacteria. Hydrogen and sodium atoms may effect this change even more effectually than manganese, provided they are liberated from a sufficiently large molecule. Moreover, such atoms are less liable to destroy the host's protective substance and to produce metallic intoxication. Therefore, the ground last covered has been in this direction, and the present paper marks the introduction of two further drugs: (1) the symmetrical urea of meta-benzoyl-meta-amino-benzoyl-amino-naphthol-3-6-sodium sulphonate, or "sum 36" for short; (2) the symmetrical urea of para-benzoyl-para-amino-benzoyl-amino-naphthol-3-6-sodium sulphonate, or "sup 36." The former is to be preferred in pure gonococcal infections, and the latter in the complications arising from the supervention of Gram-positive cocci. Both drugs were kindly made at my instigation by Mr. T. H. Fairbrother of the British Dyestuffs Corporation, Ltd. They have been in use since the latter part of 1923, and the following practical conclusions are derived from the treatment of several hundred cases.

Gonococcal Urethritis and Vulvitis.

In the male two intramuscular injections of "sum 36," each of 0.002 gram, should be made at five days' interval. In the female it is better to inject 0.01 gram intravenously. The two injections should be followed by a course of vaccines. In most cases of fresh infection this treatment suffices. Any recurrence of an acute discharge can be stopped by two further injections of the urea compound. Provided the patient is not on the point of developing an acute posterior urethritis or an acute cervicitis when the first injection is made, no complication need be expected. The immediate effect of this drug in acute gonorrhoea is disappearance of the subjective symptoms and lessening of the discharge.

Pure Gonococcal Complications.

Under this heading are included acute ophthalmia and acute primary, as opposed to recurrent, arthritis associated with a copious urethral, vulval, or cervical discharge. In these cases "sum 36" is the drug of choice. In gonorrhoeal ophthalmia in infants one or two intramuscular injections, each of 0.004 gram, will clear up the acutest case. In a boy of 6, who had a prolapsed iris, a single injection of 0.005 gram of "sum 36" caused an enormous improvement of the lesion within forty-eight hours, by which time the iris had regained its normal position. In adults the dose should be 0.01 gram, and the injections may be made either into the muscles or into the veins. In acute primary arthritis a single injection of 0.01 gram will cause the pain and swelling of the joint to disappear the following day.

Gonococcal Complications due in part to Secondary Micro-organisms.

Belonging to this category are the following clinical conditions: (1) acute Cowperitis with abscess formation; (2) acute prostatitis with abscess formation; (3) acute cystitis; (4) acute epididymitis and salpingitis. In all these cases two injections of "sup 36," each of 0.01 gram, should be made intramuscularly or intravenously at three days' interval. The two injections should be followed by one or more courses of vaccines. But in cases of epididymitis and salpingitis the vaccines should be preceded by an intramuscular injection of contramine (0.25 gram). This injection of contramine, which is the carbon disulphide product of di-ethyl-amine, reduces the formation of fibrous tissue to the minimum and thereby lessens the liability of a local recurrence in the future. Bearing in mind the common view that cases of salpingitis need operating upon, it is interesting to record that in twelve cases treated with "sup 36" all were up and about within a week of the first injection. The day following the initial injection the temperature became normal and the subjective symptoms vanished. In a case of gonococcal periostitis of the upper end of the tibia, which looked as if it needed incision, a single injection caused the redness, swelling, and pain to vanish the next day.

Chronic Complications of Gonorrhoea.

Under this heading are included stricture, chronic epididymitis, conjunctivitis, and iritis, and the various forms of muscular rheumatism—neuritis, fibrositis, teno-vaginitis, and arthritis. Contramine, probably by reason of its sulphur content, is a softener of fibrous tissue, and many strictures resisting dilatation may be rendered dilatable by injecting intramuscularly one dose of 0.25 gram and two doses of 0.5 gram at approximately weekly intervals. This treatment is advised in cases of chronic epididymitis, but it should be succeeded by a course of vaccines, because micro-organisms hidden by the fibrous tissue may be released as the latter is destroyed. Bilateral conjunctivitis is a common harbinger of polyarticular gonococcal arthritis. Since patients with this prodromal symptom are often much debilitated care must be used in stimulating their resistance, and it is wiser to make three injections of contramine, each of 0.125 gram, on alternate days. Six half-doses of vaccine (I use 1,250 million Lock Hospital vaccine, made by our pathologist, Major V. Corbett) should then be prescribed and injected every second or third day. Following this the injections of contramine should be repeated in half or full doses according to the patient's condition, and the treatment concluded with another course of vaccines. The same treatment should be adopted in severe cases of gonococcal iritis and in gonococcal arthritis when the patient is really ill. Where it is obvious that the host's resistance is at its lowest ebb, no injections should be made. In ordinary cases of gonococcal rheumatism, neuritis, fibrositis, teno-vaginitis, and arthritis 0.25 gram of contramine should be injected as soon as possible, followed by two further injections, each of 0.5 gram, at five to seven day intervals. Then a course of vaccines should be prescribed—four doses of 2,500 million and four doses of 5,000 million injected at weekly intervals. A second course of contramine and vaccine injections may or may not be necessary. In no circumstances should an infected joint be put up on a splint, and neither the prostate nor the urethra should be examined while the arthritis is active. An infected joint should be exercised at the earliest possible moment.

NOTE ON THE USE OF CHEMOTHERAPEUTIC PREPARATIONS.

The urea compounds are soluble in water. They should be dissolved in distilled water, and preferably just before use, particularly if they are to be injected intravenously. Intramuscular injections may be made anywhere, provided the bulk of the solution does not exceed 1 c.cm. The preparation "sup 36" is useful in many inflammatory conditions other than those met with in gonorrhoea. Owing to the large size of the nucleus or molecule of the urea compounds an injection may be followed by a mild degree of shock. The occurrence of shock is very rare and passes off in a few minutes.

Contramine must be injected into the gluteus medius; it should never be allowed to get into the subcutaneous tissue for fear of the formation of a sterile abscess. The recipients of contramine should avoid alcohol for two or three days after each injection, because in a few cases the taking of alcohol is followed immediately by flushing and giddiness. Contramine, provided it is not more than a year or so old, is soluble in distilled water; solutions should always be freshly prepared. It is equally valuable in cases of rheumatism of other than gonococcal origin, but in the type met with in women round about the menopause thiol-histamine, injected in 0.002 gram doses on three successive days, is better. Both these sulphur preparations were made for me by the British Drug Houses, Ltd.

OESOPHAGOSCOPY: A MEANS OF DETECTING FOREIGN BODIES NON-OPAQUE TO X RAYS.

BY

W. FRANK WILSON, M.B.,

HONORARY ASSISTANT, THROAT AND EAR DEPARTMENT, ROYAL VICTORIA INFIRMARY, NEWCASTLE-ON-TYNE.

THE fish bone, and often the dangerous sickle-shaped haddock bone, is one of the commonest of the various foreign bodies which become lodged or impacted in the human gullet. In such cases the information obtained from an *x*-ray screen examination or from a radiogram is generally unsatisfactory and may be misleading. The bismuth pastille and attempts to get some barium porridge to adhere to the foreign body have nearly always failed us.

In a certain number of cases we are convinced that a foreign body is present because of the symptoms and condition of the patient, but we are not sure where it is, though I admit that in this group the average patient locates the level fairly accurately. In another, perhaps more important, group of cases there exists a doubt, not only on the part of the surgeon but on that of the patient, as to whether a foreign body is present or not; an *x*-ray examination and radiogram turns out (in the case of a fish bone) to be negative, and the patient may be allowed to go without anything further being done. A certain proportion of these people actually have an impacted bone in the gullet, and one of three things may occur: (1) the bone may become loosened and pass into the stomach; (2) the patient may vomit the bone; (3) peri-oesophageal abscess, septic mediastinal infection, or haemorrhage from erosion of one of the large blood vessels, and death. Again, in the case of a "suspected" fish bone in the gullet, oesophagoscopy, without any definite information as to the level of the bone, may be negative, and the "intruder" may be vomited soon afterwards (if the patient is thus fortunate) owing to the manipulation of the tube causing disimpaction.

FIG. 1.—Radiogram showing shadow of bariumized wool mass enveloping fish bone in upper portion of gullet.

The above examples are a few of the snags which occur every now and then to the experienced oesophagoscopist; they will necessarily occur much more frequently in the hands of one who is not so experienced.

Any reliable information, therefore, obtainable before passing the tube, and, in addition, something which will arrest the eye at the level of the foreign body during the passing of the tube, will assuredly help to lessen the difficulties and dangers that sometimes crop up in such cases. Both of these desirable aims are attainable by the following simple method.

Small pieces of cotton-wool are lightly teased out to the size of a shilling or slightly larger and soaked in barium porridge, and are given to the patient to swallow one at a time to the number of six to eight pieces. A minute or so afterwards a teaspoonful or more of barium porridge is swallowed. Two or three minutes are then allowed to elapse to give any surplus barium time to leave the gullet. This, of course, should all be carried out in the *x*-ray room. The gullet is then radiographed. The radiogram (Fig. 1) needs no description except to note that the shadow of the wool mass held up round about the foreign body is invariably of inverted "cone" shape. On passing the oesophagoscope, the lustrous white reflex from the upper part of the bariumized wool immediately arrests the eye. In every one of the cases of large haddock bone the latter has been found closely invested by the wool, like a chrysalis in its cocoon. Figure 2 shows this quite clearly.

In some of the cases the bone was recovered together with the main mass of wool after several small pieces of wool had been removed from its upper end. In other instances, where the bone was firmly impacted in the gullet wall, the wool required removal piecemeal until the exact site of impaction was recognized and disimpaction carried out.

In all of the cases in which this method has been employed so far the site of impaction was the upper part of the gullet, as it usually is in this variety of foreign body. With the exception of one case, that of a stockily built man with a short "bull" neck, oesophagoscopy was performed under local anaesthesia in conjunction with a hypodermic injection of morphine and atropine given three-quarters of an hour or so before.

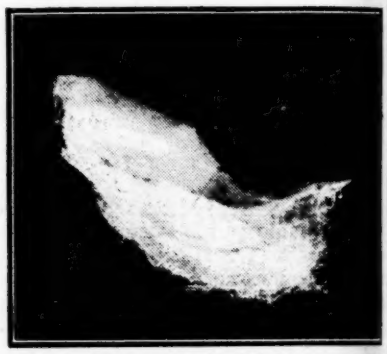

FIG. 2.—Photograph of a fish bone enmeshed in the bariumized wool after removal from gullet.

The last case of the series was that of a man who stated that he had swallowed a meat bone, which he thought had "stuck" in his throat. Radiography without the bariumized wool was negative on two occasions; on the third, with bariumized wool, it was positive. On recovering the meat bone the reason for the negative result was discovered, the bone being an extremely thin transparent disc about the size of a two-shilling piece.

In conclusion, it is perhaps as well to note that a contra-indication to the use of this method would be any degree of dyspnoea in association with a foreign body suggesting involvement of the larynx.

I have to thank Mr. J. F. Krige, house-surgeon to the throat and ear department, for the care he took in carrying out the details preliminary to *x*-ray examination; for the latter I have also to thank Dr. H. E. Gamlen, honorary assistant medical officer to the electrical department.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

THE SEPARATION OF THE PLACENTA.

FOR some time it has seemed to me that to ligature the maternal end of the umbilical cord after the birth of the child is a useless and in many cases a harmful procedure.

My attention was first called to this point when performing Caesarean section, when the object was (after the extraction of the child) to get the uterus as fully contracted as possible before introducing sutures. I noticed then that by leaving the maternal end of the cord untied, so that it could bleed freely, the placenta was more easily removed and the cut uterus contracted more rapidly and firmly and consequently needed fewer stitches.

Then again, after delivery in septic cases, such as often occur in Kashmir, where hollyhock root, cow dung, fowl intestine, and quince seeds are found in the vaginae of women treated by the native midwife, and where the cord when cut sometimes exudes a yellowish juice suggestive of faecal matter, it seemed a distinct advantage to

get rid of as much of this as possible, and I considered that the placenta came away more quickly when the maternal end of the cord was not tied but left to drain.

While the child is living and attached to the mother the blood pressure in the cord is positive. When the cord is cut and the maternal end is allowed to bleed the pressure in the cord is negative, the blood is drained out of the placental vessels, and the villi shrink in the maternal sinuses and collapse, thus favouring their detachment from the uterine wall.

Each contraction of the uterus causes blood to exude from the cut end of the cord and the placenta diminishes in volume, and each relaxation of the uterus will only loosen the villi dipping into the sinuses. Each pain causes contraction of the uterus and placental site.

On the contrary, the usual procedure of ligating the maternal end of the cord causes the pressure in the cord to remain positive, and when the uterus contracts the villi are full and the uterus cannot contract fully. When the uterus relaxes there must be a suction action exerted on the placenta, and its expulsion is delayed. I am inclined to think that tying the maternal end of the cord is inadvisable because—

(1) It delays delivery of the placenta.
(2) It prevents full contraction of the uterus, thus leading to increased haemorrhage.
(3) It increases liability to retention of placenta or portions of it.
(4) It involves a risk of septic infection through maternal sinuses which are still kept open by the engorged villi.

Perhaps one of the chief factors in the normal separation of the placenta from the uterine wall is the tendency of the empty villi to detach themselves; this may explain why the common and reprehensible custom of the native midwives of pulling on the cord to remove the after-birth is not so deadly as it sounds. They do not, as a rule, tie the upper end of the cord; if they did it would be easy to understand that pulling on it with the villi full of blood and intimately connected with the maternal sinuses might invert the uterus.

London, N.W. KATHLEEN VAUGHAN, M.B.Lond.

TORSION OF FALLOPIAN TUBE.

IN the *Epitome* (BRITISH MEDICAL JOURNAL, March 14th, para. 287) there is a note of a case of torsion of a normal Fallopian tube recorded by P. R. Michaël. The following case presents a close parallel.

A single woman, aged 19, was admitted to the Royal Infirmary, Preston, at 6.30 p.m. on March 12th, with acute pain in the right iliac fossa which had come on suddenly at 3 p.m. She had been vomiting continuously since, and was obviously suffering very acute pain, sitting up in bed to obtain relief. The abdomen moved well with respiration, and tenderness was marked in the right iliac fossa, which was rigid. The temperature was subnormal, but the pulse was 112; the urine was normal.

The abdomen was opened by a right rectus incision. The appendix was slightly congested and was removed. The pelvic organs were then explored. The right Fallopian tube was easily brought up to the wound, and was found to be black and swollen to the size of a small Victoria plum. The tube with its mesosalpinx was found to be twisted in a clockwise direction about 1 inch from the uterine end of the tube. The part of the tube proximal to the twist was quite normal, but distal to the twist the tube was deeply congested and swollen. The mesosalpinx was abnormally long as compared with that of the left side. Both ovaries were normal. There was no sign of tumour formation and no adhesions. The twist was undone by turning in anticlockwise direction and the tube removed. The abdomen was closed without drainage.

On cutting open the tube, no blood clot was found in the lumen of the tube and no diverticula noted. The wall was very congested and thicker than normal, and haemorrhages had occurred into the wall, but no evidence of inflammation was present. The menstrual history elicited was to the effect that the patient was menstruating the day of the incident and had been for two days previously. Her periods had commenced when 14 years of age, and came on every six weeks.

In this case, as in Michaël's, there were no adhesions, tumour formation, hernia, or any external cause for torsion. Also, in this case, there was a definite relation to menstruation.

I am indebted to Mr. W. McKerrow, F.R.C.S., honorary surgeon, for permission to publish this case.

DAVID J. DAVIES, M.R.C.S., L.R.C.P.,
House-Surgeon, Preston Royal Infirmary.

Reports of Societies.

THE TREATMENT OF SEPTICAEMIA.

A MEETING of the Sections of Medicine, Surgery, and Pathology of the Royal Society of Medicine was held on March 24th to discuss the treatment of septicaemia; Dr. ROBERT HUTCHISON presided.

MEDICAL TREATMENT.

BY

SIR THOMAS HORDER, BT., M.D., F.R.C.P.

Sir Thomas Horder, in opening, said that his own practice in the treatment of septicaemia differed very little from what it was ten years ago, and he believed this was the case with practitioners in general. He proceeded to define septicaemia as a condition which, although often associated with a primary source of infection, was largely independent of such an association; in some of the most characteristic cases of septicaemia the primary focus might be so inconspicuous as to remain undetected throughout the course of the disease. Septicaemia, therefore, was a condition in which micro-organisms existed and multiplied in the blood independently of the primary focus of infection or of the state known as "focal sepsis." Apart from certain much less common organisms, the two chiefly to be considered were *Streptococcus pyogenes* and *Staphylococcus aureus*. The main principles of treatment fell into three groups: general measures, bacteriotherapy, and chemotherapy. He put general measures first because they had chronological precedence; certain general measures were naturally taken even before the exact bacteriological diagnosis was established, and promptness in respect of these measures was the essential point in the treatment. According to some practitioners, bacteriotherapy would come next in order, and according to others chemotherapy. In the treatment of no disease did the personal equation of the doctor enter so largely as it did in acute septicaemia, not merely because the practitioner was apt to become enamoured of a particular line of treatment, but because there were so many possible things to do. The choice was so large that it was necessary to form a plan of campaign in every case, and not introduce, with an air of panic, new remedies at any particular juncture.

He took as an example a case of *Streptococcus pyogenes* infection of an acute kind, such as one in which the primary focus was a *post-mortem* wound of the finger, followed rapidly by cellulitis, lymphangitis, and general infection. The first general measures were rest (including rest for, in this example, the infected limb), fresh air, and sunlight. Fresh air was important in the treatment of pyogenic infections, and if the alarm which some patients felt at this procedure could be overcome they should certainly be treated on a balcony, or, if the season permitted, in the open air altogether. He could testify to the good effects of a full diet, which need not be entirely fluid unless it be during the height of the acute process. In some cases septicaemic patients required a good many calories of food, and very frequent feeds. Another important item in treatment was reassurance, by which he meant the general conduct of the patient's mind and his attitude towards his condition. This was the more important in a disease in which the treatment was hardly less irksome than the disease itself. A great deal of tact and coaxing was often required to get the various measures carried out without upsetting the patient's equanimity. In America hydrotherapeutic measures were favoured a good deal, and perhaps more might be done in the way of hydrotherapy here, since it was not absolutely necessary to take the patients out of bed for the purpose. Attention to elimination—bowels, skin, and kidneys—was important, as also was sleep. As to anodynes, Sir James Paget, after convalescence from his own acute septicaemia, paid a high tribute to the value of opium. There was no contraindication to the use of opium in a good many septicaemic cases; in these days, Sir Thomas Horder thought, there was an unjustifiable tendency to be afraid of opium in acute febrile conditions which were prolonged and which led to physical and

mental discomfort. Conference with a surgical colleague would be necessary, in the case he had taken as an example, with regard to treatment at the site of infection by surgery and drainage. He had found it useful to alternate the continuous bath with the almost vertical elevation of the infected limb. Care should be exercised to avoid the local use of strong antiseptics, which interfered with the vitality of the tissues. Intravenous infusions were useful in the fulminating type of case. His experience of transfusions in three really bad cases was not promising; perhaps other observers had been more fortunate. Drugs had to be taken in conjunction with the other measures already described. He placed arsenic first, administered intramuscularly for preference; from this drug very few cases of septicaemia did not derive some benefit. His favourite preparation was sodium cacodylate, and he gave it in conjunction generally with the drug he put next on his list—namely, nucleinic acid—usually 1 grain of sodium cacodylate in a saturated solution of nucleinic acid, 1 c.cm. for convenience, and this was given intramuscularly twice in twenty-four hours for the first two or three weeks of an acute case. Sodium cacodylate had very low toxic effects *qua* arsenic, and a convenient method of knowing that the patient was receiving an effective dose was the smell of the breath. After arsenic and nucleinic acid he would place opium. He did not think that the reputation of quinine was borne out by experience. Alcohol was also of considerable value in very acute cases.

Turning to specific measures, Sir Thomas Horder said that in a case of acute streptococcal septicaemia his general rule was to give a very liberal dose of antistreptococcic serum intravenously as soon as the patient came under treatment—not less than 50 c.cm. on the first day, repeated on the second, and possibly on the third, and his choice in the *pyogenes* type of infection—which these acute cases invariably were—was the univalent form of the remedy. By the second or third day the causative organism was usually isolated and a vaccine could be prepared. In this acute type of case the sensitized vaccine had advantages over the ordinary vaccine. The first dose recommended in an adult was 100 million, the second 250 million on the third day, and the third dose 500 million on the fifth or sixth day. If ordinary vaccines were given the doses were much smaller—perhaps half a million, 1 million, or 2 million, according to the severity of the case, the doses being spaced in accordance with clinical observation. He had practically no experience, in acute cases, of detoxicated vaccines. "Immunogen" was a type of antigen which differed from vaccines in that an attempt had been made to get into the antigen, in addition to the endotoxin of the organism, certain products of auto-digestion, and disintegration by heat and chemical action, of the cell structure of the organism. He had also put on his list under "bacteriotherapy" some combined methods, by which was meant starting with serum and following with vaccine, this being the practice favoured by most workers. Chemotherapy seemed to him, for pyogenic infections, very disappointing. During the war a good many accounts were published of the effect of a lavage of the blood stream in septicaemias. War experience in this class of case, as in a good many others, had to be considered in relation to the circumstances, the type of injury, the help given by the surgeon in regard to the primary focus, and so on. The intravenous use of various germicidal substances—chlorine derivatives, flavine, collosol metals—seemed to him to have been not very helpful in civilian practice.

Sir Thomas Horder next touched upon the acute form of septicaemia due to *Staphylococcus aureus*. This was more pyaemic in its features, and therefore, if not fulminating, and not leading to such lethal conditions as infection of the heart wall or valves or to meningitis or to pericarditis, and if the focal abscess chanced to be in a position in which the surgeon could deal with it, better results were likely, inasmuch as time favoured the pyaemic patient more than the septicaemic patient. But against this advantage had to be placed the fact that there was nothing equivalent to an antistreptococcic serum in fighting a case of acute staphylococcal septicaemia. So far as bacteriotherapeutic methods were concerned, one fell back upon vaccines, which, however valuable they might be in the more chronic and localized forms of infection by the staphylococcus, were not so helpful in the generalized acute and chronic conditions. With regard to chronic streptococcus septicaemic processes, the treatment of the most tiresome and perhaps most common type of the disease—namely, ulcerative endocarditis—seemed to him to be still very baffling. Of late years he had been struck by the fact that the more one pursued certain general measures the more hopeful became the treatment of the condition, which seemed to be an infection of very low resistance. He described a case of ulcerative endocarditis which, after a great deal of vaccine therapy and chemotherapy, was sent almost in despair to the South of France, and had improved markedly as the result of living entirely in the sun and air. The spleen had become very large during the six months' residence abroad—it occupied the whole of the left half of the abdomen; there was a suggestion that the improvement was associated with the splenomegaly by way of some specific contribution to the patient's resistance through the infarction of this organ. The speaker, in conclusion, referred once more to the value of non-specific measures in the treatment of all cases of septicaemia, and regarded them, in the present state of our knowledge, as of great importance.

SURGICAL PROPHYLAXIS AND TREATMENT.

BY

R. P. ROWLANDS, M.S., F.R.C.S.

Mr. R. P. Rowlands dealt with the subject from the surgical point of view. Touching first on prophylaxis, he said that the surgeon aimed to prevent local and systemic infection by (1) taking every precaution against infection during operations; (2) prompt excision of contaminated wounds such as those inflicted in war or, in civil practice, by accident; (3) prompt removal or treatment of local sources of systemic infection, such as acute appendicitis. This treatment was still too often delayed, with the result that nearly 3,000 people in England and Wales died every year from appendicitis, nearly all of them owing to the septicaemia of peritonitis. He himself had never lost a case of appendicitis which had been operated on within twenty-four hours. What had been said with regard to early operation in appendicitis applied equally in the perforation of peptic ulcers, and, more or less, in abscesses in other parts of the body, which should be opened without delay before they caused septicaemia. Many a life was lost from septicaemia by delaying amputation until it was too late, especially in such cases as acute infective osteomyelitis of the long bones. On opening an abscess, boil, or carbuncle, it was important not to trespass on and infect the surrounding healthy tissues. He had known septicaemia follow the too deep incision of a small boil in the auditory meatus. With regard to treatment, there should be collaboration between physician, surgeon, haematologist, and bacteriologist, and an endeavour should be made to find, and remove or treat, the primary or other source of infection. The hope of finding a collection of pus somewhere in the body should never be given up. The opening and draining of such an abscess often brought success in apparently hopeless cases. Repeated examinations of the blood for leucocytosis should be made, also systematic and complete examinations of the body for hidden collections of pus. Sir Thomas Horder, in an obscure case of acute septicaemia which he saw with the speaker, diagnosed suppuration in a thyroid cyst which was low in the neck and mostly intrathoracic in position. Removal of the cyst, which was full of streptococcal pus, cured the patient. Many similar instances came into his mind of pus found in hidden places, such as deep in the buttock, in the loin, under the diaphragm, in the liver, in the pleura, deep in the calf muscles, and in the pelvis or prostate. Whole-blood transfusion was valuable in selected cases, and would probably have a greater future than immunotransfusion because it was more immediately available, and time was obviously of great importance in acute septicaemia. Of splenectomy for septicaemia he had had no experience, but some success had been recorded at the Mayo Clinic in subacute cases when the spleen was enlarged, although they had had no recoveries in cases of ulcerative endocarditis.

IMMUNIZATION AND CHEMOTHERAPY.

BY

LEONARD COLEBROOK, M.B., B.S.

Dr. L. Colebrook described some observations which he and his colleagues had made at St. Mary's Hospital bearing on a study of the essential lesion which made these cases of septicaemia so fatal. In most septicaemias the breakdown of the mechanism of defence must be associated with a diminution of the functional activity of the leucocytes. Although they were present in normal numbers, the leucocytes were often, to all intents and purposes, out of action—their function was reduced to anything from one-half to one-tenth of the normal. That was largely the reason why the microbes were able to establish themselves in the blood stream and why the patient so frequently did not recover. It was not known precisely why the leucocytic efficiency was so injured, but it was assumed to be due to the microbic toxins. This reduction of function was not confined to cases of septicaemia; it occurred in a smaller measure in all local infections, even in a common cold, but in septicaemia it was seen in an extreme form. It was not the whole story in septicaemia, but it filled a large part of the picture. What one had to do to save the patient was to neutralize the toxin which was destroying the leucocytes, or—the same thing—to kill off a large number of the micro-organisms. Dr. Colebrook then went on to deal with three lines of specific treatment: active immunization, passive immunization, and chemotherapy. With regard to active immunization in cases of septicaemia he was not hopeful. Treatment by vaccines was not likely to be successful, at any rate in the grave cases where the leucocytic function was reduced to below half the normal. With regard to passive immunization—meaning the use of serums and immunotransfusion—the use of serums also seemed rather hopeless at present. One of his colleagues had been doing some work on an antistreptococcal serum, but his conclusions were not very encouraging as to the value of this agent for fortifying the patient's blood. The price which patients had to pay, in the shape of the miseries of serum sickness, made the use of serum hardly justifiable until at least it was possible to say definitely that one particular serum was good, or better than another. With regard to immunotransfusion, this was introduced by Sir Almroth Wright, who suggested that a non-specific immunization of the donor's blood should be obtained before use. The practice had been to give the donor 1,000 million of the staphylococcus and to wait three or four hours, and then take the blood. A good many cases, mostly of puerperal septicaemia, had been treated by this method in the last year or two, but on the whole the speaker had been disappointed. He did not think that grave cases would be saved by this method alone. In some of the slighter cases it would be useful. It was hoped to get a more effective method of immunizing the donors, and he was working towards a specific immunization. Possibly in conjunction with chemotherapy, immunotransfusion would prove of great value.

Unlike the two previous speakers, Dr. Colebrook felt that the whole future for these cases was bound up in chemotherapy. Before a drug was used as a chemotherapeutic agent in septicaemia it must be demonstrated that the drug would not still further diminish the patient's leucocytic efficiency or destroy other essential tissues, and that the patient's blood after a given dose could be shown to be bactericidal to the infecting micro-organism and so continue for a certain period, or that it was capable of neutralizing toxins. Eusol, flavine, and other drugs had been tried, and did not fulfil the latter part of these requirements; but there was one group of drugs which was more hopeful—namely, the neosalvarsan group. When neosalvarsan was given to a patient in the medicinal dose for curing the syphilis, and the patient's blood was taken after a period, perhaps one hour or up to six hours, it was found that the serum, which previously had no power of killing the streptococci, had now considerable power, and usually, he thought he might say, the leucocytes were not harmed. He felt that this was the beginning of better things in the treatment of septicaemia. In America and France some hopeful work had been done along these lines.

THE PATHOLOGIST AND THE CLINICIAN.

BY

SIR ALMROTH WRIGHT, M.D., F.R.S.

Sir Almroth Wright said that there were two ways of viewing medicine, one of which was illustrated by the clinician's view put forward that evening, and the other by the contentions of the pathologist. He compared clinical observation of the results obtained with different remedies to the experience of a man who was accustomed to travel on railways, and who gave his views, based on that experience, of recent railway engineering progress; whereas the pathologist found his analogy in the skilled engineer, who was able to say exactly in what respects the science of transportation had been improved and in what respects it came short. With regard to immunotransfusion, he did not want this to be put down as one of the failures of pathology, but it was true that what it could accomplish was quantitatively limited. It depended upon the number of micro-organisms which had to be dealt with in the blood, and it was certainly no remedy in the severer cases. He criticized the tendency of the clinician in appealing invariably to the remote results, and paying no heed at all to the immediate results. The clinical method could, indeed, take no cognizance of the direct result, because that direct result could not be seen by the naked eye—it was discovered only by laboratory experiment. He hoped that in discussions of this sort at some future time—it might be a hundred years hence—it would be acknowledged that the clinician could pass no absolute verdict; all he could say was, "this has been recommended, and on the whole has proved beneficial."

FURTHER DISCUSSION.

Mr. ZACHARY COPE said that after such a slashing attack on the clinicians it was difficult to say anything more from the clinical side, but at the same time he felt bound to point out that the pathology of the blood was not yet known. Surrounding the problem of immunity in a large measure were doubts and suppositions—only the shibboleths could be uttered, "We believe, we think, we hope." True, there were factors which were certainly known and which could be demonstrated under the microscope, but there were many more things not yet found out, and quite as essential to the elucidation of the problem of immunity in septicaemia as the things already known. How was it proved that the leucocytes were the only or the chief agents in immunity? How was it that certain micro-organisms selected certain parts of the body for their activity, and chiefly those tissues only? The gonococcus grew when invading the mucous or serous membranes, but put it in the connective tissue and there was not much formation of pus. What was the function of the cellular tissue of the body in resisting septicaemia? What was the protection accorded to the body by the epithelium apart from the leucocytes? Until accurate knowledge was forthcoming on the selective activity or protective defence of the epithelium and connective tissue they were all in a maze. Immunotransfusion had proved a straw in these cases of septicaemia. Until some definite knowledge on all these points was forthcoming, the clinicians, while trying everything which was put before them from the scientific side, must also be allowed to use their judgement, face to face with patients. So many problems still remained that it was not wise to dogmatize overmuch.

Mr. HERBERT TILLEY gave an account of an attack of septicaemia from which he himself suffered fifteen years ago. He received a prick on the knuckle through a glove. The day previously he had returned from a six weeks' holiday, and he never felt better in his life, so that the question came up as to whether his immunity had been lost during his holiday. On the evening of that day he felt a slight irritation at the site of the prick, and the next morning noticed a blush on the knuckle and some red streaks up the wrist, very like the photographic illustrations of a lightning flash. During the day he felt unwell and had a raised temperature. A colleague gave him an injection of antitoxic serum, after which he felt for a time perfectly well, but at night he had two or three shivers, and became very ill with a high temperature. Within the week following he

had seven operations, and at the end of that time there were seventeen drainage tubes in position in his arm. Then a profuse leucocytosis set in, the arm began to suppurate, and from that moment he turned the corner. He found enormous benefit from having the arm in a hot bath, and also from holding it up, clinging to some support above him. Sleeplessness with high temperature was a great trial. Morphine made him feel ill next day. Heroin suited him very much better, but those things failed in time, and then he tried tincture of opium, chloral, and bromide, with good results.

Dr. ROBERT HUTCHISON, in closing the discussion, noticed that alcohol had not been mentioned as a general means of maintaining the patient's strength in septicaemic infection. He understood that the experimental evidence was rather against its use, but the effect of alcohol on an animal and on a man might be two rather different propositions.

FOOT-AND-MOUTH DISEASE.

AT a meeting of the Comparative Medicine Section of the Royal Society of Medicine held on March 25th, the President, Mr. F. H. HOBDAY, in the chair, Sir STEWART STOCKMAN gave an address on some problems of foot-and-mouth disease.

The subject, he said, was very difficult to treat satisfactorily in the short time at his disposal. There was a large amount of information available on the subject of foot-and-mouth disease, but it could not be readily summarized. He proposed considering the question at this stage from three aspects—invasion, susceptibility, and immunity. The incubation period of the disease might be as short as forty-eight hours, but was normally about five days. As long a period as three weeks had been recorded, but he was very sceptical about such records. He thought that in these cases the virus had been carried on the animal's coat for some time, and afterwards licked off. Lesions were common on the tongue (where the vesicles were often confluent), on the snout, teats, and even in the intestine. They were largely superficial, a fact which accounted for their quick healing. The virus seemed to attack the horny layers of the epidermis. Thus the horn of the claws was frequently detached by being underrun by the virus. This doubtless accounted for some of the "carriers" of foot-and-mouth disease. In thousands of cases, however, he had only seen three animals which could be thus implicated. The horn took six to eight months to slough off, and it was only when it was completely detached that the virus was released and the new infection started. The disease was not a fatal one. As a rule the mortality was about 4 per cent., but in very virulent outbreaks as many as 20 per cent. died. The great trouble was the dislocation of business due to restrictions of trade. In milch cows the value of the animal would often be considerably reduced through damage to the udder, feet, and so on.

Methods of invasion, Sir Stewart Stockman continued, were very difficult to determine. He could definitely rule out animals as the source of the initial outbreaks. Men and hay and straw were undoubtedly capable of mechanically carrying the virus. Hay and straw were not imported from countries where the disease was known to exist, but it was impossible to control the straw used in packing, and this might possibly be one method of invasion. Our greatest danger was from the neighbouring countries in Europe and from the Argentine, where the disease was common and completely uncontrolled. He did not think that men and foodstuffs, however, were the usual causes of outbreaks. He had examined the records for the last thirty years, and he had found that about eighty were what he might call "invasion" outbreaks. These were either initial outbreaks, or outbreaks which occurred at a long distance from any other or within such a short time of another as to be obviously distinct. When analysed these outbreaks disclosed some interesting features. Only two had originated in Scotland, while over 50 per cent. had occurred south of a line drawn from the Wash to the Severn. In that area two well defined areas—east and west—had been the scenes of the greatest number of outbreaks. Practically all the others were located on the coast or the river valleys. He thought that the agency of man or foodstuffs was too fortuitous to explain this distribution, and he believed it was due to migrating birds. Scotland received birds almost exclusively from the north, where the disease was absent. An analysis of the times of the outbreaks seemed to support this view. The virus could live for three months under favourable conditions. Cold and dark favoured it, while it was destroyed quickly at its incubation temperature. Hay or straw prolonged its life. Drying in the sun was rapidly fatal, but if dried in gentle heat it lived for months. It was still infective in dilutions of over a hundred thousand. The susceptibility of the various animals varied. Cattle, pigs, and sheep were very susceptible; but the disease took several days more to pass from cattle to sheep than from cattle to cattle. Once established, however, this period was reduced to normal in sheep as in cattle. Goats were only slightly more resistant to the disease. Horses, dogs, and cats were only occasionally attacked; while fowls were relatively insusceptible, if not completely resistant. All could transmit the disease mechanically. Rodents were an important factor; but he did not think that rats naturally contracted the disease. After an outbreak cattle-sheds were disinfected and afterwards used without the disease recurring, although the rats did not leave the premises during the intervening period. Guinea-pigs were important from the laboratory study of the disease. A serum conferring a passive immunity for a fortnight would be most useful for "exposed to infection" animals. These animals, which were slaughtered at present, constituted about 90 per cent. of the total. If these could be given a passive immunity for a few weeks it would enormously decrease the expense of controlling an outbreak.

Dr. ARKWRIGHT said that the two most important discoveries in the study of the disease were—first, the discovery that the cause was a filterable virus in the true sense of the word; and, secondly, that a passive immunity could be given by the blood. In the laboratory study of foot-and-mouth disease the discovery that the guinea-pig was a suitable host had placed in the hands of workers a most valuable instrument. This animal had the additional advantage that the disease did not naturally pass from guinea-pig to guinea-pig.

BACTERIOLOGY OF PUERPERAL SEPSIS.

AT a meeting of the Edinburgh Obstetrical Society held on March 11th, Dr. JESSIE EELES read a paper on some problems in the bacteriology of puerperal sepsis.

Dr. Eeles first dealt with the possibility of auto-infection with vaginal organisms, metastatic auto-infection from other foci in the body being an acknowledged fact. Streptococci were isolated from the vaginal secretion of nineteen out of seventy non-pregnant women, and from eleven out of seventy pregnant patients. All of the first series were non-haemolytic types and one of the second was haemolytic. The existence of such organisms in the vagina was no proof that auto-infection occurred; haemolysis was not a test of virulence. Animal experiments had not shown that these organisms were capable of producing an acute infection. No case had been recorded where an organism was isolated from the vagina in pregnancy and was shown later to have been the cause of fever in the puerperium. Agglutination experiments suggested that the reason why these vaginal organisms seemed to be harmless for their carrier was that she was immunized against them. Only in cases where there was much lowering of resistance due to bleeding, bruising, or exhaustion were these organisms likely to cause an acute infection; the dangerous organisms were those introduced from without. The second question dealt with was the significance of blood invasion in puerperal fever and in septic abortions. The uterus after the fourth day of the normal puerperium was always heavily infected with organisms, which had ascended to it from the vulva; among these organisms were streptococci. The same was true of the uterus in incomplete abortions; streptococci were isolated in four out of six cases of incomplete abortions, which were afebrile before and after

curettage. One of the strains was haemolytic. It had been shown that, apart from the existence of any virulent infection, when the uterus contracted in incomplete abortion, any of the organisms normally present in it might be forced into the blood stream through the open veins of the placental site. There they were soon destroyed, but the patients reacted to each invasion with a rigor. A positive blood culture in such cases before the uterus was emptied was not necessarily of serious import. When the uterus ceased to contract rigors would cease, provided that there had been no true infection present. Emptying the uterus would do no harm in this type of case, but where no acute streptococcal infection of the uterus wall was present local interference would aggravate the condition. In puerperal fever, on the other hand, blood invasion was always serious and indicated that an infection was present, which had spread beyond the uterus and reached the pelvic veins. In nine out of sixty-two cases of puerperal fever organisms were recovered from the blood. Four of the nine cases were fatal, and the others were serious cases. The organisms found were: haemolytic streptococci, three cases; non-haemolytic streptococci, three cases; *B. coli*, three cases. One of the fatal cases was due to *B. coli*. In six other fatal cases no blood-stream invasion could be detected. With regard to the treatment of blood-stream infections, antiseptics of many kinds had been administered intravenously with varying results, but the best results were to be expected from antistreptococcal serum given in large doses and repeated. Vaccines were not of much use in the acute stages. Ligation of the infected veins should be reserved for chronic cases of pyaemia, with intermittent blood invasion, where the patient's resistance did not improve with more conservative methods of treatment.

Dr. W. A. DAFOE then gave an account of an epidemic of puerperal sepsis in Toronto due to *Streptococcus haemolyticus*, including eight fatal cases. At the same time there was a marked prevalence of sore throats, sinus infections, and middle-ear troubles throughout that city, and it was thought that these factors might be contributory. Septicaemic symptoms started between the second and fifth days with one or two rigors, after which a steady rise of temperature was maintained. The lochia were scanty, purulent, and somewhat fetid in all cases: the patients died within six days of the onset of the symptoms. *Streptococcus haemolyticus* was found in the noses or throats of both house-surgeons, 15 to 20 per cent. of nurses, and 35 per cent. of the students. Strigent precautions were taken, and carriers were not allowed to return to the hospital until two negative swabs had been obtained. The patients were first treated with a polyvalent antistreptococcic serum and quinine bihydrochloride intramuscularly, but in later cases phenol was administered intravenously. Phenol had been found by Dr. Maitland to increase the phagocytic power of the white blood corpuscles and the bactericidal power of the blood serum. The standard dose consisted of 0.75 c.cm. of 0.5 per cent. phenol. This was given intravenously once daily for three doses; a day was then missed; the treatment continued thus three to four times. Indirect immunotransfusion was also tried, with good results. Early immunization was advised for any patients exposed to infection. The maximum action of the drug occurred in half an hour and lasted for three hours after its administration. It was very gratifying to find that no further cases had developed after stringent preventive measures had been taken.

ASTHMA.

AT a meeting of the Glasgow Southern Medical Society held on March 18th, with Dr. JOHN GARDNER in the chair, Dr. JAMES ADAM opened a discussion on asthma.

From a study of 840 cases, Dr. Adam laid down the following propositions as to causation: (1) that asthma is a toxaemia; (2) that the toxaemia arises partly in the bowel, partly in the tissues, partly from the absorption of nitrogenous poison under putrefactive action, but mainly from an error in nitrogenous metabolism following imperfect oxidation or enzyme action; (3) that the metabolic error is closely connected with excess of carbohydrate in the diet, the oxidation of this excess interfering with the oxidation of the more complex protein molecule; (4) that the toxaemia is manifest first as catarrh, later as spasm in the respiratory tract; (5) that the nose is an important factor both in the origin and in the course of the disease; (6) that owing to the prolonged toxaemia there is nervous hyperexcitability, affecting especially the vagus. He supported these views by reference to the fact that 42 per cent. of his cases occurred in the first decade—the age of dietetic and hygienic errors, and, moreover, the age of the "immunity struggle" against the infections prevalent in that decade; by the cures effected on asthmatics by active service during the war; by the absence of asthma among races who had to hunt for their food; by researches carried out by himself and others on animals attacked by a similar disorder; by the week-end incidence of a large body of cases; by the therapeutic test, which showed 70 per cent. recoveries under a very simple régime. From a series of blood and urine analyses he showed a relatively low urea value as compared with non-protein nitrogen in asthmatic bloods, a low urea value to total nitrogen in asthmatic urines. He held that the modern confusion between asthma and anaphylaxis arose from a misconception of what anaphylaxis really was. A sensitizing dose of protein introduced otherwise than by the alimentary canal produced a profound though not apparent change, so that, after an interval, a second dose resulted in illness, and often death. The most striking effect in a general affection of the tissues was on smooth muscle, and the organ most affected was that where the muscle was most strongly developed. Anaphylactic phenomena might appear in asthmatics in whom the muscles of the bronchioles were hypertrophied by prior toxaemia and spasm. This term had, however, been unwarrantably extended. It had been loosely applied to include all idiosyncrasies to food or non-protein drugs, even on their first introduction. "Allergy" was the word used for these reactions, and the protein skin reaction had been introduced to test for their presence. Fifty per cent. positive results had been claimed by Coke and others. Dr. Adam considered that 50 per cent. failures proved something simpler and more radical than anaphylaxis in asthma, even in many of the positive cases. In his own series, including hay fever, which was not asthma, he had 40 per cent. positive results, and he did not put 40 per cent. emphasis on them. He summed up by saying that asthma was in reality a symptom producible (1) slowly by toxaemia and commonly as one of a chain of respiratory symptoms, (2) suddenly by special toxaemia or anaphylaxis, or (3) suddenly by strong nasal irritation. As regarded treatment, the main principles were to secure a state of general well-being, and to see that the nose was right. He gave a short account of his own operative and dietetic procedure.

Dr. IVY MCKENZIE considered that Dr. Adam's theories might yet be found to fit into the whole scheme of metabolic perversion. He thought the congestive prodromata of asthma, as represented by nasal catarrh, enlarged turbinates, and laryngitis, might be due to a central poisoning of the roots of the nerves in the medulla. In connexion with the vagal element in asthma, he had found that a dose of apomorphine sufficient to produce vomiting would abort an attack of asthma. He concurred in the attack on the "anaphylactists."

Dr. KERR LOVE was sceptical of the value of the protein tests. He recalled a case strongly positive to pork to whom he at once administered three pork chops with no asthma. He thought Dr. Adam's work a great contribution to preventive medicine.

Dr. W. HERBERT BROWN referred to the food factor in cases of urticaria and eczema in infants. He was struck by the preponderance of the dispensary patients over private patients in this type of disorder, and considered dietetic and environmental disparity a reason for this.

Dr. J. L. HOWIE declared himself a disciple of Dr. Adam, and spoke to the value of his principles in general and in throat and nose work. Drs. CASSIE, FRASER, DAVIDSON, and REGINALD DUNLOP also took part in the discussion.

Reviews.

BILLROTH'S "MEDICINE" IN GERMAN UNIVERSITIES.

THAT THEODOR BILLROTH'S famous work, *Lehren und Lernen der Medicinischen Wissenschaften* has not hitherto been translated into English is remarkable, but it is even more surprising how applicable what he wrote nearly fifty years ago is to the present-day problems of medical education. *The Medical Sciences in the German Universities*,[1] with its subtitle *A Study in the History of Civilization*, has now been admirably translated into present-day English terms, and has the further advantage of an introduction by Professor W. H. WELCH, who pleasantly outlines the grandeur, wide sympathies, and literary talent of the Vienna surgeon, and mentions that the plain-spoken truths about the conditions in the university aroused considerable resentment, attended even by racial and riotous disturbances, in Vienna. The work is divided into four parts, dealing with (1) the development of the faculties of medicine at the German universities; (2) the present (1870) German method of teaching the medical sciences; (3) the student and the future physician; and (4) the teaching staff.

In tracing the history of clinical instruction, Billroth sketches the formerly subordinate position of surgery, which did not obtain an independent position till the seventeenth or eighteenth century, and it is now scarcely credible that the great Albrecht von Haller lectured at Berne for many years without ever having touched a human body with a knife. The qualifications of a surgeon are graphically expressed in the sentence, "A man who has not been an assistant in a surgical ward and has not performed the typical operations dozens of times on the cadaver, until he can do them as well in his sleep as when fully awake, will never be an operator." It is, of course, interesting to compare the methods of teaching in the German schools of medicine in Billroth's time with our own; even then the systematic lecture was becoming obsolete, and on this tendency he utters some words of warning which are not without their application at the present day. Speaking of the introductory portions of lectures, he remarks that the modern youth likes them as little as the public does the long overtures of modern operas. One of the few places in which his views depart from the general atmosphere of modernity is where he says that physiology is now at its high-water mark and that a professor of medical chemistry is not absolutely necessary at every university. On the other hand, he advocates courses in dietetics and balneology in every university—a piece of advice that certainly has not borne universal fruit. The problem of the State versus university qualification in medicine is discussed at length, and the shortage of rural practitioners noted; in areas where poverty makes it necessary, the doctor, like the clergyman, should, he thought, be provided with a house, and be guaranteed a certain amount for his services.

The effective teachers are divided into (1) those with the formal talent for presenting their subjects systematically to average students and are good conductors if not live wires; though there are exceptions, they tend to become petrified after fifteen years; (2) the founders of schools and the really great leaders are always of a somewhat visionary and highly imaginative nature, and not infrequently artistic, or musicians or poets. Although for their pupils these gifted men have a wonderful attraction, the personal fascination of such intellectual giants may be relatively short-lived unless their investigations are made known in the written word. Of the two categories, the efficient systematic teacher and the genius, Billroth obviously prefers the latter.

This is an attractively written book on a subject of absorbing interest, and its reappearance appropriately coincides with Mr. Abraham Flexner's survey of *Medical Education* during the last fifteen years in Europe and America, also published by the Macmillan Company. The two should be read and assimilated by all interested in medical education.

[1] *The Medical Sciences in the German Universities: a Study in the History of Civilization.* Translated from the German of Theodor Billroth, with an introduction by William H. Welch. New York: The Macmillan Company. 1924. (Roy. 8vo, pp. xiii + 292. 15s. net.)

THE EXAMINATION OF THE EYE.

METHODICAL examination is the essence of all good clinical work in every department of medicine or surgery. In no other region of the body can so much be seen, if it be looked for, as in the eye. How easy it is to overlook important details is well known by all ophthalmic surgeons. It cannot be too often, or too strongly, impressed upon the student that only by methodical routine examination are we in a position to form a just estimate of the condition of the eye. It may not be possible to account for all we see, but the student, or surgeon for that matter, who conscientiously carries out his routine examination of a case may feel that he has done his duty by his patient even if the interpretation of the details he has found be obscure.

Mr. BASIL LANG, in his book on the *Routine Examination of the Eye*,[2] describes a single manner of carrying out each part of the examination of the eye. As he says in his preface, it may not be the only way, it may not, in the opinion of some, be the best way, but it is a perfectly satisfactory way, and enables the observer to obtain the desired information. With this we cordially agree; the student will find in this book an absolutely safe guide to the examination of the eye. It is clearly written and well illustrated.

Those of our readers who have had the advantage of being trained by the author's father will read the book with pleasure and will recall to memory Mr. William Lang's *Methodical Examination of the Eye*, a book which was the ophthalmological bible of their junior days, in that it pointed out most clearly the narrow track that led to ophthalmic salvation. We assume that this work is no longer in print, and we are glad indeed that the son has written this little new textbook on the same subject for the benefit of those who "knew not Joseph." Mr. William Lang's book was labelled Part I; all who worked in his clinic at Moorfields or the Middlesex Hospital looked forward to the publication of the remaining part or parts; but none ever appeared. We sincerely hope that Mr. Basil Lang will find time to complete the idea of his father.

[2] *The Routine Examination of the Eye.* By Basil Lang, F.R.C.S.Eng. London: E. Arnold and Co. 1925. (Cr. 8vo, pp. 156; 30 figures. 6s. net.)

STEINACH'S OPERATION.

PROFESSOR STEINACH of Vienna found that, after tying the vasa deferentia in old rats, the animals appeared to take a new lease of life; they put on fat and became agile and sexually potent. This result was attributed to an increase in the number of interstitial cells after the operation. It is claimed that a similar rejuvenescence follows vasoligation in man, and Dr. PETER SCHMIDT, in his book which, in the English version, bears the title *Theory and Practice of the Steinach Operation*,[3] has attempted to substantiate the claim by recording the results of eighty-four cases in which he performed the operation.

The interpretation of the results in man is complicated by the difficulty of eliminating the factor of suggestion and by the absence of any satisfactory measure of the degree of rejuvenescence obtained. Conclusions are based on a general impression of the effects, and will naturally vary in different observers. Thus very marked rejuvenescence is said to have occurred in Case 3, an innkeeper, aged 62, who was accustomed to drink brandy by the bottle, who was incapable of carrying on his business, was suffering from aortic valvular disease, purulent bronchitis, old pulmonary tubercle, gall stones, severe fibrosis of the kidneys, enlarged prostate with cystitis, and severe generalized arterial disease, causing death from apoplexy four months after the operation. Many would doubtless attribute this result to the imagination rather than to the inter-

[3] *The Theory and Practice of the Steinach Operation.* With a report on one hundred cases by Dr. Peter Schmidt (Berlin), and an introduction to the English edition by J. Johnson Abraham, C.B.E., D.S.O., M.A., M.D.Dub., F.R.C.S.Eng. London: W. Heinemann (Medical Books), Ltd. 1924. (Cr. 8vo, pp. xiv + 150; 3 diagrams. 7s. 6d. net.)

stitial cells of the testis. In other instances recorded there is no room for doubt as to the existence of mental abnormality, as in the case of the guard, aged 32, who was afflicted with the distressing impulse to press against women in the street and produce an ejaculation if possible. A case of this kind bears very little analogy to the effects of vasoligation in rats. Further, in some of the cases it is difficult to avoid the suspicion that the patients were making fun of the doctor, as in Case 76, a veterinary surgeon, aged 57. In the first weeks after the operation the condition is stated by the author to have been remarkable: the patient has "exquisite fancies; walks again as straight as a soldier; runs upstairs as actively as one does after a pleasure trip; and, at night, has erotic dreams pretty regularly."

Steinach's operations on rats suggest that man might possibly derive some benefit from vasoligation, but the suggestion is very much weakened by a perusal of Dr. Schmidt's work.

ANAESTHESIA AND ANAESTHETICS.

In the second edition of his book *Anæsthesia*,[4] Dr. J. T. GWATHMEY has introduced a few alterations. He has omitted the chapters formerly devoted to electrical and sequestration anaesthesia, to mental influence and hypnosis, and to statistics; the list of anaesthetics has also been left out. Special chapters have been written by collaborators who are authorities in their respective fields of work.

The book is divided into twenty-two chapters and has two appendixes. It opens with the history of anaesthesia, which is most interestingly set forth, and then the general physiology of inhalation anaesthesia is discussed very fully and adequately. Before passing on to the various anaesthetics in general use, the author discusses the use of rebreathing in the administration of anaesthetics, and points out its advantages and disadvantages. Nitrous oxide, ether, ethyl chloride, and chloroform are then each dealt with fully, after which the selection of anaesthetics and the technique for special operations are discussed. Other chapters are devoted to treatment before, during, and after anaesthesia, to anaesthesia by intratracheal insufflation, to anaesthesia by colonic absorption of ether vapour, and to local anaesthesia. Third-stage anaesthesia is discussed in a separate chapter, while local anaesthesia as applied in dentistry is also given a chapter to itself. Spinal anaesthesia is treated at very great length—in fact, as many pages are devoted to this method as to local anaesthesia. Intravenous and synergistic anaesthesia, the therapeutic uses of inhalation anaesthetics, the medico-legal status of the anaesthetist, ethylene anaesthesia, and painless childbirth by synergistic methods, each receives attention in a separate chapter. The appendixes are devoted to oxygen and to the doses suitable for animals respectively. The author has produced a very valuable work, which will be welcome to British anaesthetists as showing the apparatus and methods employed in America. As a book of reference the work is also of very great value, as the author quotes chapter and verse for all his statements, and has no hesitation in stating the opinions of other authorities where they happen to differ from his own. This absence of dogmatic statement, while of use to the expert, is, perhaps, a disadvantage to the student, who is apt to be confused by a multiplicity of opinions, methods, and apparatus. Consequently the book is not one to be recommended to the British student as a first book to be read, more especially as he will not be familiar with the apparatus figured, and such apparatus as he is likely to use does not appear in the illustrations. Where the whole book is so excellent, both as to subject-matter and illustrations, it is difficult to formulate criticisms. It is perhaps allowable, nevertheless, to question whether such a large subject as local anaesthesia had not better have been dealt with in a volume by itself. This comparatively new and rapidly growing branch of the science and art of anaesthesia can hardly receive the attention it deserves in a chapter of some sixty pages, well as has the collaborator done his work. Explanations have necessarily to be cut down to a minimum, and clearness is liable to be sacrificed to verbal economy. The mere presentation of diagrams, however excellent, is not of itself sufficient to compensate for extreme restriction of the explanatory matter. Altogether, however, this new edition enhances the author's already great reputation as a scientific anaesthetist and an authority on his art.

[4] *Anesthesia*. By James Tayloe Gwathmey, M.D. Second revised edition. London: J. and A. Churchill. 1924. (Med. 8vo, pp. xxv + 799; 275 figures. 25s. net.)

EARLY CHEMISTRY.

THE author of *The Story of Early Chemistry*[5] has undertaken a great task. The history of chemistry contains matter of no less interest than the histories of men and empires. History proper is a woven fabric; the fabric cannot be woven until the facts have been collected for the master weaver. Only a chemist could write the history of chemistry, but the vocation offers its votaries little freedom for the pursuit of any literary inclination with which they may be endowed. Hence the perfect history, which we still await, can only grow out of the labours of the annotator of chemical records, and his notes must then be handled by one possessed of no little literary skill. These remarks are not intended to depreciate the value of STILLMAN'S book, but it partakes more of the character of annotation than of constructed history. He might, indeed, have become the historian we desire had he had more time to devote to writing, for there are many pages in which the historian's gift is evident. Clearly the vast extent of ground he attempted to cover in the time at his disposal precluded a free exercise of the historian's art. The book describes what is known of chemical arts regularly practised by the ancients. It throws much light on the confusion from which the experimental efforts of the alchemists suffered; at one time they worked with different substances bearing the same name, and at another with the same substance presented under different names. This confusion goes some way to explain the mystical conceptions that surrounded their strange theories and beliefs. Between the Middle Ages and the eighteenth century there was a transition period, during which realities contended with imposture. Then came the phlogiston theory; it served as the focus of chemical thought, and had the effect of co-ordinating for the first time experimental researches of diverse kinds. Finally, the phlogiston theory, having served its day, yielded place to the foundations of modern chemistry. The dominant impression left by a perusal of Stillman's work is of the extraordinary amount of labour that must have gone to the acquisition of his materials. The book seems to be a compendium of all that has been written on chemical beliefs and on actual achievements in early chemistry. It is provided with a good index and an ample bibliography. It will not only be read for its archaeological interest, but will serve as a useful book of reference.

[5] *The Story of Early Chemistry*. By John Maxson Stillman. New York and London: D. Appleton and Co. 1924. (Demy 8vo, pp. xiii + 566. 18s. net.)

HEALTH AND PERSONALITY.

DR. JOHN S. GRIFFITHS has contributed a volume to the Library of Philosophy and Religion series, entitled *Health and Personality*.[6] The author approaches his subject by dealing in successive chapters with the various biological stages of individual development; commencing with infancy and childhood, he ends up with the "later years," which, as he observes, can be the best period of life since they give what was missing in former stages—serenity, gentleness towards others, tolerance towards all, and the peace of life's twilight. The book is written in an easy, discursive style, and the subject-matter includes not only much excellent advice on health, but observations on life in general, and on a variety of topics such as tropisms, conditioned reflexes, eugenics, endocrines, philosophy, religion, manners, friendship, suggestion, psycho-analysis, occultism, recreations, and house furnishing. Throughout his book

[6] *Health and Personality*. By John S. Griffiths, M.R.C.S., L.R.C.P., D.L. Library of Philosophy and Religion. London: Hodder and Stoughton, Ltd. 1924. (Cr. 8vo, pp. 320. 6s. net.)

the author emphasizes his views by a number of apt quotations.

Dr. Griffiths makes no attempt to write profoundly; the book is simple and readable, and we have no doubt that the ordinary layman will find it helpful and interesting. The medical practitioner, also, will probably not feel that he has wasted his time if he dips into its pages.

NOTES ON BOOKS.

THE third edition of Dr. J. B. HURRY'S book on *Vicious Circles in Disease*[7] has been translated into Spanish, and several new chapters have been added; a coloured frontispiece illustrates the "circular process" in medicine. We published reviews of the third English edition on September 13th, 1919 (p. 346), and of the French translation of this edition on March 1st, 1924 (p. 387).

Professor WYLLIS BANDLER'S *Medical Gynecology* has reached a fourth edition[8]; in its preparation the author has had the assistance of several colleagues. Dr. W. T. Dannreuther has contributed chapters on urinary conditions and written most of the section on radium and *x*-ray therapy; Dr. George Mannheimer has rewritten the chapter on constipation; while Dr. Walter Highman has added the chapter on syphilis. Professor Bandler has rewritten the section on the endocrine glands, in regard to which he is a great enthusiast and no mean authority. Modern advances in psychological medicine, which are of great importance in medical gynaecology, receive suitable attention. Whatever may be the reader's opinion of the propriety or value of attempting to separate medical gynaecology from surgical gynaecology, there can be no doubt that this book contains much in regard to minor methods of treatment which will be of value to practitioners. Frankly, many of these additions cannot be properly described as medical; they are really minor surgical procedures. At the same time their consideration on a detailed scale would tend to overload the ordinary textbook of gynaecology, and this may be the justification for a second volume. The gynaecological surgeon will be the first to appreciate the valuable results which follow prolonged and painstaking adoption of some of the minor methods of treatment. The practitioner will also find great help in this book, as it explains in detail the various minor methods which can quite well be employed in a consulting room or in the patient's own home.

[7] *Los Circulos Viciosos en Patologia.* Por el Dr. Jamieson B. Hurry. Traducción española, corregida y aumentada, de la 3ª edición inglesa por el Dr. Diego Moxó y Queri, con un prólogo del Dr. Augusto Pi Suñer. Barcelona: Editorial Médica Mariano Roig. 1925. (Roy. 8vo, pp. xv+338; 21 figures, 1 plate. Pesetas 14.)

[8] *Medical Gynecology.* By Samuel Wyllis Bandler, M.D. Fourth edition, thoroughly revised. Philadelphia and London: W. B. Saunders Company. 1924. (Sup. roy. 8vo, pp. 930; 157 figures. 40s. net.)

PREPARATIONS AND APPLIANCES.

Glazings Transparent to Ultra-violet Rays.

WE have received from the manufacturers (179, Great Portland Street, London, W.1) a sample of material to which they have given the name "Windolite." It has been used by poultry keepers and market gardeners as a substitute for glass, but it is now suggested that, as it allows ultra-violet rays to pass much more freely than ordinary glass, it may be of use in medicine. It is made of acetone cellulose reinforced with wire netting of a mesh about one-eighth of an inch in diameter. It is light and portable, and may therefore be of use in the tropics to form the windows of a country dwelling. It has been examined for us, and it is found that, as claimed, it lets the ultra-violet rays through freely. In the original make it passed the ultra-violet rays down to 275 mm., but in a recent sample down to 232 mm. Ordinary window glass stops the ultra-violet rays shorter than about 320 mm. The active biological rays, so far as the skin is concerned, are those from about 310 to 250 mm., but those between 300 and 290 mm. are particularly active. "Windolite" would probably be useful for open-air shelters and verandahs.

A new glass, manufactured by Lamplough (47, Banbury Road, King's Norton), called "Vitaglass," is a "cathedral glass" when rolled, but can be blown as a clear transparent glass. It lets ultra-violet rays through down to 275 mm. It may be useful for skylights, verandahs, and the upper part of windows of hospitals, schools, and nurseries. It may also be found of value for incandescent tungsten filament lamp bulbs.

Metallic Bismuth for Intramuscular Injection.

Bismuth has been proved to be a spirillicide of specific character. In the treatment of syphilis, intramuscular injections of preparations from various compounds of bismuth have been used with results so encouraging as to stimulate the search for preparations of the metal that will yield still more advantageous effects. One, which has hitherto given the greatest satisfaction, is a simple suspension of the metal in an isotonic solution of glucose. Such a preparation was described in our issue of March 14th (p. 516). We have now had the opportunity of examining another preparation of this kind. It is made by Messrs. Burroughs Wellcome and Co., and is supplied under the trade name of hypoloid bismuth metal. The metal has a high degree of purity; freedom from impurity is especially important as regards lead, which would be likely to introduce disturbing effects. We note also that the particles are of fairly uniform size, a quality which enables the dosage to be better regulated. The ordinary dose for an adult is 1 c.cm., containing 0.2 gram of the metal.

PULMONARY TUBERCULOSIS TREATED BY M. SPAHLINGER'S SERUM.

WE have received the following letters with regard to the action of the antituberculous serum made by M. Spahlinger (Carouge, Geneva), recorded in our issue of January 3rd (p. 43), and to subsequent correspondence. They have reference, as will be seen, in particular to the case of "R. G."

SIR,—I should like to deal with two points recently raised in the BRITISH MEDICAL JOURNAL in connexion with my work, a recent illness having prevented me from dealing with them sooner. The first, concerning the clearing of shadows in the radiogram, raised in your issue of January 10th (p. 92), was answered by your review of Dr. Jacquerod's book in that issue (p. 76). This clearing of the shadows is due to "the process of resolution."

The second point concerns the case of Mr. R. G. I understand that Dr. Trechsel himself is dealing with the letter published on February 21st (p. 387) in a note which he is sending you. When Mr. R. G. started to resume normal life he was seen by Dr. Hudson and Dr. Stephani. The former sent me his report of the case on October 14th and the latter on October 12th, requesting me to forward them to you. Excess of work prevented me from doing this until October 27th. I had nothing to do with the conception of these letters, nor did I see the proofs, and I am therefore unable to understand why your correspondent should mention my name in connexion with them. Dr. Hudson and Dr. Stephani were so impressed with the rapid results achieved by my new partial serum that they considered it their duty to place the facts before the medical profession. May I point out that Mr. R. G. was under Dr. Trechsel's care, and that I had nothing to do with his treatment during his last illness.—I am, etc.,

Geneva, March 24th. H. SPAHLINGER.

SIR,—My attention has been drawn to a letter which appeared in your issue of February 21st (p. 387), raising the question whether or not Mr. R. G. had died of pneumonia. As I was the physician in charge, responsible for the diagnosis and treatment, I feel called upon to send you the following details.

Mr. R. G.'s case was considered as hopeless by Dr. Hudson, Dr. Stephani, and myself. The patient had massive bilateral disease, with cavities, and was in a dying condition. Large quantities of Spahlinger's partial serum were given, and ten weeks later all signs of activity had disappeared; chest signs dried up, temperature and pulse became normal, practically no cough, only a trace of sputum in the morning. The radiogram showed that most of the shadows had disappeared, thus indicating that the process of resolution had been extremely rapid. Thereafter the patient resumed his normal life.

On October 22nd Mr. R. G. stayed out at night insufficiently clad and complained of a chill. The next day he was kept in bed with the symptoms of a severe cold, with high temperature (it was normal on the previous evening) and violent coughing attacks. On October 25th a pulmonary aneurysm ruptured. Mr. R. G. recovered from the haemorrhage, which was profuse, and was not followed by another attack. He developed acute lobar pneumonia and died on November 3rd.

The fact that during his last illness pneumococci only were present in the sputum in large numbers, and that I did not consider it necessary to administer any further doses of Spahlinger's serum, proves my faith in the diagnosis of acute pneumonia as the cause of death.

What was claimed in Dr. Hudson's and Dr. Stephani's letters, which appeared in your issue of January 3rd, and what is also claimed by me to-day, is that Mr. R. G. was in a hopeless condition when Spahlinger's serum was started on August 1st, and that, ten weeks later, the intensive serum treatment had arrested the disease. If an aneurysm had formed in a cavity and ultimately ruptured, surely Spahlinger's treatment could not prevent that. It was an accident which in no way diminishes the favourable impression obtained and the remarkable curative effect produced by the serum.—I am, etc.,

Geneva, March 25th. DR. E. TRECHSEL.

British Medical Journal.

SATURDAY, APRIL 4TH, 1925.

THE LIBERTIES OF THE PROFESSION.

IN the BRITISH MEDICAL JOURNAL of March 21st (p. 566) we directed the attention of all medical practitioners to certain proceedings under the Insurance Acts reported in the SUPPLEMENT of that week (p. 122) under the heading, "A fatal case of diphtheria." We recur to the subject because it concerns the rights and liberties of the profession. The report in question was that of a Committee of Inquiry, consisting of a barrister-at-law and two medical practitioners, appointed by the Minister of Health in accordance with the Regulations made under the Insurance Acts, to investigate the professional conduct of a London insurance practitioner (designated by us as "Dr. Z") in respect of his treatment of an insured patient. The London Insurance Committee brought a charge of gross negligence against Dr. Z in failing to diagnose diphtheria until a late stage of the disease, and demanded his removal from the medical list for the County of London. The Inquiry Committee, in its report to the Minister, submitted a full and careful account of its findings of fact, and its findings, we may remark, put a very different complexion upon some of the alleged facts of the case and grounds of complaint formulated by the London Insurance Committee. The Inquiry Committee included in its report certain observations. Of these the one to which the Ministry of Health should have attached great importance, as going to the root of the matter, is as follows: "When a charge of gross negligence is made against a doctor it seems just to avoid an attitude of mind which—to use a colloquial phrase—savours of being wise after the event, and not to attach undue weight to the death of the patient with the obvious exception of cases in which the death can be proved to be attributable to such negligence." In the course of its six inferences of fact the Inquiry Committee exonerated Dr. Z from the very serious allegations made against him. The furthest it went in criticism was the following reference to Dr. Z's omission to take a swab from the throat: ". . . we can only describe the fact as unfortunate that the respondent, in his persistent diagnosis of tonsillitis, did not adopt this further test for the purpose of checking his opinion." The Committee, moreover, found that "no possible suggestion can be made against the respondent for any neglect in attendance," and it noted the great care exercised by him in the case. "In our opinion," the Committee concluded, "the charge of gross negligence wholly fails. The facts indicate the possibility of criticism of the respondent in the matter of his professional skill, but an illness which commences with tonsillitis and is complicated by the subsequent onset of diphtheria and Vincent's angina is probably not of common experience, and adds to the difficulty of making a correct diagnosis. We think that the complainants were not justified in making their representation and thus putting in motion the machinery which involved the inquiry held by us. In pursuance of this view we recommend that the complainants be ordered to pay to the respondent his taxed costs of the inquiry."

The Minister of Health, in pronouncing judgement, agreed that Dr. Z should receive his costs, but, in complete disregard of the tenor of the Inquiry Committee's report, informed the complainants that Dr. Z ought to be fined £20, and in order to ensure compliance with this opinion the Minister has withheld £20 from the money payable to the Insurance Committee. The letter from the Ministry of Health to the London Insurance Committee sought to justify the infliction of this fine by reference to some advice tendered from an unnamed quarter. "The Minister," it said, "is advised that some of the symptoms from which, according to the report of the Inquiry Committee, this patient suffered, were such as should have suggested the presence of diphtheria. . . ."

The annotation in the JOURNAL of March 21st ended by inviting the Ministry of Health to send us any explanations it might wish to offer of this strange action; but so far the invitation has met with no response. A question has, however, been asked in the House of Commons, as reported in our Parliamentary columns this week (p. 676). Mr. Herbert Williams, member for Reading, asked the Minister of Health on March 26th why penalties of £10 and £20 were imposed on two doctors, who had been accused by the London Insurance Committee of gross negligence in cases of appendicitis and diphtheria respectively, but had been found innocent by a committee appointed by the Minister of Health. Mr. Neville Chamberlain's reply must be regarded as most unsatisfactory. In particular we would draw attention to two passages. Mr. Chamberlain said that the Inquiry Committee's findings of fact indicated that in one case (clearly that of Dr. Z) "the doctor had failed to exercise reasonable care"; and, later, he said that "there was no ground for the statement that the practitioners were found innocent." As Dr. Harry Roberts remarked in his trenchant letter printed in our last issue (p. 631), "If we stand this we shall stand anything."

On the day before the Minister put forward his defence in the House of Commons this matter had been brought formally to the notice of the British Medical Association, as recorded in the proceedings of Council published in the present issue of the SUPPLEMENT. It arose in connexion with the final draft of the Memorandum of Evidence to be submitted by the Association to the Royal Commission on National Health Insurance. Dr. Brackenbury, in studiously temperate terms, submitted an additional paragraph which he had drafted in regard to the judicial or semi-judicial functions of the Ministry of Health. The paragraph makes reference to the inexplicable action of the Ministry in imposing penalties on practitioners, and says it is exceedingly disquieting to find that, though the machinery set up in agreement with the profession is used, and the agreed procedure is followed, "there are cases in which there seems little or no relationship between the decisions of the Ministry and the reports or recommendations of the bodies on which action is supposed to depend." Emphasis is laid on the point that a strict distinction must be drawn between professional conduct in the attention given to a patient, and the nature of the exact professional treatment given to the patient; and the paragraph closes with a declaration that the propriety or otherwise of any particular method or line of treatment ought not to be made the subject of investigation in connexion with the insurance service.

Dr. Brackenbury told the Council that the grievance would be plainly stated to the Royal Commission by the Association's witnesses, who would say that the profession could not tolerate this sort of procedure if it went on without explanation from the Ministry. These assurances, together with Dr. Dain's significant

remark that the Insurance Acts Committee would have some very definite things to say on the subject to the Ministry of Health, will doubtless be read with satisfaction, not by insurance practitioners alone, but by the medical profession at large. Our profession is not quick to express its feelings; but, unless we are misinformed, it is already gravely concerned for the defence of its freedom against this new kind of attack.

THE EXPECTATION OF LIFE IN GLASGOW.

MR. WILLIAM JONES, secretary to the public health department of the Corporation of Glasgow, has prepared and published two new Glasgow life tables—one based on the census of 1871 and the deaths registered in the three years 1870-72, the other based on the census of 1921 and the deaths in 1920-22. He is to be congratulated on the completion of a very troublesome task, and, as pointed out in a preface by Dr. A. K. Chalmers, it places Glasgow in what is surely a unique statistical position in having life tables covering a hundred years. The first was published in 1829, and was based on data for the six years 1821-27. The figures, of course, are not strictly comparable as between the successive tables, owing in the earlier data to errors as to population and in the later to extensive additions to the area of the city by absorption, mainly of adjoining burghs. But broadly the statistics do give a very striking picture, first, of deterioration of health conditions owing to the extraordinary growth of Glasgow during the industrial revolution in the earlier part of the nineteenth century, and next, of improvement of health conditions in the past half-century. As is customary in such tables, the figures for the two sexes are given separately.

In 1821-27 the expectation of life at birth was in males 34.12 years and in females 36.64 years. By 1870-72 the corresponding figures were reduced to 30.93 and 32.61 respectively. In other words, the outlook as to survivorship was three to four years worse than it had been forty years earlier. But by 1881-90 the loss was more than wiped out, the expectation being for males 35.18 and for females 37.70, which is just about a year better than in 1821-27. In the next forty years the improvement was very notable, the male expectation being no less than 48.41 years and the female 53.19.

These figures all relate to the whole lifetime, from birth onwards. But so great is the mortality in the early years of life compared with the later that the survivors at the age of 10 years have an average prospect of life longer than the average expectation at birth. Starting therefore to make comparisons at 10 years old, and beginning with the life table of 1821-27, the expectation of life amongst males was 42.27 years, or fully eight years greater than at birth, and in females 45.24, or over eight and a half years greater. It is interesting to note that at this age period the fall in expectation as between 1821-27 and 1870-72 was not so great as in infants, being only 2.12 years in males, though in females it was 3.41 years. Coming to the life table of 1881-90, the 10-year-old children had made a great advance—to 37.70 years' expectation in males and 45.44 in females, which latter figure, however, is only 0.20 better than the original 45.24 of 1821-27. Finally, by 1920-22 the expectation of male children who had survived through the first decade had risen to 50.81 years and of females to 53.19, so that, adding the first ten years which they had already lived, their mean age at death would be 60.81 in males and 63.19 in females.

Under the heading, "The increase in life capital," Mr. Jones submits some striking mass figures, following which he writes: "The present population of the city will, therefore, live among them approximately twenty million more years of life than a similar number of persons fifty years ago, fully nine millions being among males and ten and three-quarter millions among females," but he points out that "proportionately the added years are mainly of adult ages." The details emphasize this reservation. The percentage increase at age 0-4 inclusive is only 2.9, while at 35-54 inclusive it is 30.2, and over 75 years the gain is only 5.2 per cent.

In comparing the life tables of 1920-22 relating to Glasgow, Liverpool, and Manchester, the curious result is shown that in males Glasgow has a slight advantage over both towns (much less over Manchester than Liverpool) at the ages of from 12 to 42 years. Beyond the latter age both Lancashire cities, especially Liverpool, have an appreciable advantage. In females the position is different. At all ages from 12 to 82 (with one fractional exception) both Liverpool and Manchester make a better showing than Glasgow, especially from 12 to 27 years, where Glasgow's expectation is less favourable to the extent of from one year to a year and a half.

Dr. Chalmers makes a most interesting suggestion as to future life tables. He is very strongly disposed to think that they should be built up, not on the general population and its deaths, but on populations grouped according to the number of rooms they occupy and the deaths occurring among them, and Mr. Jones gives some relevant figures based on the census population of 1911. The figures show the expectation of different ages from 10 to 65 according to whether the occupied houses had one, two, three, or four and more apartments, the advantage being with the larger houses. Dr. Chalmers points out that "at 20 years of age the expectation of males in one apartment families was 2.28 years less than the average, and 5.18 years less than in families occupying four apartments and upwards. At 65 these differences almost wholly disappear." With wise caution, however, he does not assume that such differences are to be wholly attributed to housing, and he concludes by observing that "the future of public health administration must concern itself with the elucidation of the causes of these differences."

NEW DRUGS FOR OLD.

THE use and abuse of drugs was the subject of an animated discussion at a meeting of the Hunterian Society on March 30th, when Mr. H. W. Carson was in the chair. Professor W. E. Dixon, after a reference to the prevailing "therapeutic nihilism" which condemned drugs of all kinds as valueless, said that, while students in this country were taught diagnosis as they were taught it in no other, the teaching of therapeutics was inadequate. A French professor who had been in London for three months said to him that the great difference between French and British medicine was that "we know what to do when we do not know what is the matter with the patients; you know what is the matter with them, and do not know what to do!" Patients were less interested in diagnosis than in treatment, and the physician who had not been properly taught the art of healing was apt to resort to the circulars he received from wholesale druggists with regard to the value of substances the nature and composition of which was sometimes not even stated. In passing, Professor Dixon said a word about vitamins; after stating that fat-soluble vitamin was fixed

in association with the cholesterol of the fats, and was increased as the result of the action of ultra-violet rays, he imagined a future in which mercury-vapour lamps would be suspended over the dining table, throwing down rays to vitalize the food before it was taken! In chemotherapy he found the new outlook in medicine, but chemotherapy must advance further to the production of substances which would be specific in their action against micro-organisms and would not, as did most of the substances now used, kill the body tissues at the same time. Dr. H. H. Dale said that although his time was spent in the laboratory he was not so closely bound up with the scientific method as to demand that the choice of drugs must be limited to those concerning which the fullest scientific knowledge was available. The use of drugs on a supposedly scientific basis was not without danger, which was in many ways greater than that attaching to the use of drugs on the basis of careful clinical experience, for it was very easy, by false and superficial analogies, and by the facile acceptance of any kind of specious explanation, to admit all kinds of things as playing a part in real scientific treatment, whereas in truth what was being done was more irrational than a procedure based upon an enlightened and not too conservative empiricism. At the same time, vague impressions as to efficacy could not be taken as a safe basis for the reasonable use of drugs. Quinine was known to be a specific against the malarial parasite, but what was to be said for the wide use of quinine by the public, largely at the instigation of the medical profession, as a prophylactic against all kinds of catarrhal infections, especially epidemic influenza? There was never a threatened epidemic of influenza but some journal published an interview with "an eminent Harley Street specialist," who advised taking quinine in the form of ammoniated tincture. What real ground was there for the suggestion that it had any prophylactic effect? If there was no real ground the attempt so to use it was an abuse. Again, potassium iodide was known to have a definite specific action on certain forms of chronic infection, particularly tertiary syphilis, but it had come to figure in the list of therapeutic agents as having a general value for reducing swellings and promoting the absorption of effusions of almost every kind. Was there any real basis for that belief? If not, it must be ranked as an abuse of a valuable drug. The salicylates had a specific action in acute rheumatism, but was it not an abuse to prescribe salicylates haphazard for any kind of painful condition of unknown etiology? Medical men were exposed at the present day to some danger on account of their genuine modesty. The people who introduced new drugs had learnt to get at the medical profession on the side of its modesty, for a medical man was prone to receive with quite undue respect any kind of plausible jargon which on the face of it appeared scientific. He quoted some words written by an eminent leader of the profession, now dead, in an introduction to a book which was supposed to give a scientific account of colloids and their use in medicine. This leader, for whom he had the greatest respect, wrote: "It is an obvious desideratum that the drugs employed to combat disease should be in the colloidal state." If he had put it in exactly the opposite way—if he had said that since bodily structures and fluids are colloidal it is an obvious desideratum that any drug should be in the crystalloid state—it would have been just as true and convincing, perhaps even more so. While ready to admit that the colloidal state for certain kinds of medication might have great advantages, and that at the back of it all there was something very valuable from the therapeutic point of view, it was often, Dr. Dale concluded, supported by such a parade of terms from physiochemistry and biochemistry, on the lips of people both inside and outside the medical profession, that it was really time that something was done to rescue from abuse what might be a very valuable idea in treatment. The ensuing discussion was carried on with great animation, and the clocks of Cheapside were approaching midnight by the time the two openers had replied to some little thrusts at the scientific as opposed to the clinical method.

THE NATURE OF INHIBITION.

IT is a well recognized physiological fact that certain nerve impulses cause a diminution or cessation of activity in the structures upon which they act, but the actual mechanism of this process of inhibition is obscure. In the current number of *Brain* Dr. E. D. Adrian, F.R.S., discusses the various theories which have been advanced as the result of work on the subject in recent years. There are two forms of inhibition, peripheral and central, but it is possible that the differences between them are more apparent than real. Peripheral inhibition is exemplified by the action of the vagus on the heart and by the action of the sympathetic on plain muscle—for example, of the intestine. Now this action of the sympathetic is dependent, as is all sympathetic action, on the liberation of adrenaline at the site of action, probably at the myoneural junction. It is suggested that the inhibitory action of the vagus upon the heart is due to the formation at a synapse or myoneural junction of an inhibiting substance analogous to the adrenaline which is produced by sympathetic activity. That this conception is not entirely theoretical is shown by the experiments of Loewi, who found that the fluid coming from a heart which had been inhibited by vagal stimulation had the property of inhibiting another heart into which it was introduced. Similarly, sympathetic stimulation is said to yield a fluid capable of producing a sympathetic (that is, accelerating) effect on another heart, and it is argued that in the one case an "inhibiting substance," and in the other a "sympathetic substance," must have passed into the fluid. Should these experiments be confirmed, further research will be required into the chemical nature of the "substances" and their mode of action on the muscle fibre. With regard to this last point Adrian refers to a recent confirmation by Samojloff of the experiments by Gaskell on the heart of the tortoise. It is known that during the passage of a contraction through the auricular muscle the active part of the muscle is electro-negative to the neighbouring inactive part, and Gaskell showed that if the auricle was inhibited by stimulation of the vagus the opposite electrical condition prevailed, the inhibited part of the auricle being electro-positive to the rest of the muscle. This alteration of the electrical state during inhibition Gaskell related to a chemical change, and it is possible that such a chemical change is a result of the liberation of the "inhibiting substance." Inhibition as a function of the central nervous system was shown by Sherrington to be a fundamental feature of all reflex movements. If the quadriceps muscle is caused to contract reflexly, as in the knee-jerk, such a contraction is accompanied invariably and simultaneously by relaxation of the antagonistic hamstring muscles—that is, the antagonists are reflexly inhibited. Strychnine and tetanus toxin abolish the reflex inhibition of the antagonists, and both prime movers and antagonists are thrown into powerful contraction in the reflex spasms seen under the influence of these poisons. Sherrington proved that the seat of the inhibitory process in reflex movements is within the spinal cord, and it is conceivable that the inhibition is due to the release at certain synapses in the reflex arc of a specific inhibiting substance such as has been postulated in the case of peripheral inhibition. There is, however, another possibility. If conduction in the central nervous system is governed by the same laws as conduction in peripheral nerves, then, following the passage of any impulse, there must occur a "refractory state" in the conducting path during which the path is incapable of conduction, and is in a state of rest or recuperation. It is

suggested that through the existence of synaptic connexions between the pathways to the prime movers and the antagonists, the impulse which causes contraction in the prime movers may set up a refractory state in the path to the antagonists. All stimuli being thus prevented from reaching the antagonists, these muscles relax at the same time as the prime movers contract. This theory, which has some experimental support, would therefore explain reciprocal inhibition in reflex actions on the physical basis of a refractory state instead of assuming the production of an entirely hypothetical chemical "inhibiting substance."

THE GOLD TREATMENT OF TUBERCULOSIS.

OUR readers will, we feel sure, be grateful to Professor Moellgaard of Copenhagen for the trouble he has taken to prepare the account of the treatment of tuberculosis by the gold salt he introduced some time ago, and to which he gave the name "sanocrysin." The use of heavy metals (gold, mercury, copper, and bismuth) for attacking the tubercle bacillus in the body has engaged the attention of many workers during the last twenty or thirty years, but the results have been inconclusive. Professor Moellgaard advances evidence that the gold salt he uses gives encouraging results in certain types of tuberculosis. It will be seen that towards the end of his paper (p. 647) he says that the curative results obtained in the animal experiments have been secured mostly in cases of the exudative pneumococcic type of tuberculosis of the lungs. This type was chosen in order to avoid the variations well known to occur in the chronic type. Other experiments have demonstrated that it is possible to cause typical "productive" tuberculosis to heal in its earliest stages, with sclerosis and calcification, and clinical experience has shown that cases of acute extensive miliary tuberculosis of the lungs can be brought into a condition favourable for healing. The term "productive" tuberculosis puzzled us, and we therefore applied to Professor Moellgaard for an explanation, which he has been good enough to supply. The distinction between exudative and productive tuberculosis of the lungs has reference, he says, to Aschoff's views of the pathological anatomy of pulmonary tuberculosis; these views have been generally adopted in Scandinavia in so far as regards the distinction between exudative and productive phthisis, because the distinction is confirmed by *x*-ray examination. He applies the term "exudative tuberculosis" to caseous pneumonia in all its stages, not only as a large lobular infection, but as a pneumonic process around other tuberculous foci. These conditions are termed "exudative" because their principal features are exudation of fibrin and white blood corpuscles accompanied by desquamation of the alveolar epithelium, as in the case of other forms of pneumonia. In the *x*-ray picture they appear as soft formless infiltration like wool, and there is no pleurisy. By "productive" tuberculosis is understood a process the principal feature of which is the building up of new (fibrous) tissue and the production of real tubercles. The *x*-ray picture shows a spotted and striped infiltration with sharper outlines than in the exudative type. Professor Moellgaard regards the distinction between these two forms as very important in treatment by sanocrysin, because the results of the treatment as shown by the *x* rays are different. In the exudative cases the infiltrations in the picture disappear almost completely, but in the productive cases the infiltrations grow sharper under the sanocrysin treatment because of the fibrous tissue that is formed. Whether the expectations built upon sanocrysin are fulfilled or not, the line of pharmacological reasoning on which Professor Moellgaard bases the selection of gold, and of this particular salt of it, will be found both interesting and instructive. The drug is not yet available for general use, but limited supplies have been received by the Medical Research Council, and have been tested in certain clinical units. The report on the therapeutic results will, we understand, be made available before long.

ILLNESS AND DEATH OF JOHN HUNTER.

AN abstract of Sir D'Arcy Power's Hunterian Oration on "John Hunter as a man" was published in our columns on February 21st (p. 379). We then gave some idea of the gist of his address, but time and space forbade such a leisurely consideration of it as its merits deserved. We have now had an opportunity of studying its full text in a well printed pamphlet, and of appreciating the quaint illustrations, reproduced from Jesse Foot's *Life*, by which it is adorned. The author of the last mentioned scurrilous work had a considerable practice among sufferers from venereal disease, but no valid claim to be considered as a rival of Hunter, whom he consistently abused, while he denied to him all originality and attributed the authorship of his works to Tobias Smollett. The Orator justified his choice of a subtitle—"A martyr to science"—by bringing forward evidence that John Hunter's long and severe sufferings were due to the syphilitic infection which followed his self-inoculation. This was, indeed, an outstanding feature of the Oration. No new literary material was available, but Sir D'Arcy Power reviewed in turn the record of each illness from which Hunter suffered, and stated his opinion that the symptoms were indications of syphilitic disease of the arteries at the base of the brain. This view may be right; it is impossible to declare it erroneous, so that it may be held out of place to question it. Yet if Sir D'Arcy Power's view becomes established, the writings of Hunter may come to be regarded as the products of a sick brain. But is such a conclusion necessary? Cases involving the same question are common—that is to say, infection by syphilis, the manifestations arrested in the early secondary stage by mercurial treatment, and in later life symptoms indicating arterio-sclerosis. It is to be remembered that Hunter's brother William had died at the same age, 65, after presenting similar symptoms. Hunter inoculated himself in 1767. He died on October 16th, 1793. His own account of the results of his inoculation includes an expression of his opinion thereon—"The time the experiments took up, from the first insertion to the complete cure, was about three years" (Works (Palmer), 1835, ii, 419, para. 3). His body, including the brain, was examined *post mortem* without any lesion being noted which would now be certainly attributed to syphilis. The viscera of the belly and head were found loaded with blood, but otherwise nearly in a natural state, with the exception of the carotid arteries and their branches within the skull, which were in parts thickened and ossified. In the chest the left lung had become attached to the costal pleura by old and firm adhesions; but the heart was found to be the chief seat of disease. The pericardium was unusually thickened, but did not contain much fluid. The heart itself was small, appearing too little for the cavity in which it was contained; its diminished size was the result of wasting, and not of strong contraction of its fibres. Two opaque white spots were seen on the left auricle and ventricle respectively. The muscular structure of the organ was pale and loose in texture. The branches of the coronary arteries which ramify through the heart were converted into long tubes, with difficulty divisible by the knife. The mitral valves were much ossified. The aorta was somewhat dilated, its valves thickened and wanting pliancy, and the inner surface of the artery was studded with opaque and elevated white spots (Works (Palmer), 1835, i, 132). It may fairly be asked what firm grounds there are for going beyond the statement that Hunter suffered from angina pectoris due to arterio-sclerosis. Both Sir William Osler and Sir James Mackenzie referred to Hunter as a type of

arterio-sclerosis without adding anything as to syphilis, Mackenzie going on to remark that the brain was not involved. Sir D'Arcy Power has gracefully dedicated the reprint of his own oration to a former Hunterian Orator (1889), his own well beloved father, Henry Power, ophthalmic surgeon to St. Bartholomew's Hospital, whose ability, as well as his personal charm, is manifest again in this worthy successor.

THE STRUCTURE OF THE ATOM.

IN the Friday evening discourse at the Royal Institution last week Sir Ernest Rutherford unfolded the fascinating story of the inquiry into the structure of the atom, and the nature of the forces which surround its nucleus, which has been proceeding at the Cavendish Laboratory, Cambridge. During the past year he and his co-workers continued to bombard the atoms of various elements with the alpha particles of radium or radio-active substances. The alpha particle is the most energetic projectile known; it has a velocity of 10,000 miles a second, and it is capable of ploughing its way through the structure of any atoms in its path. The atoms of the different elements all have a minute charged nucleus, surrounded at a distance by a number of electrons in motion. Sir Ernest Rutherford represented the nucleus by a small handball on the lecture table, and said that the nearest electron on this analogy would be about as far away as the distant wall of the theatre. By the law of probability, therefore, the collisions of alpha particles with the charged nucleus cannot be frequent, and it has been necessary to make very numerous observations of the effect of bombardment in order to discover what happens when the alpha particle gets into the intense electric field of the nucleus. From a study of the angle of deflection of the particle in such circumstances it has been hoped to find out what it is that holds the atom in equilibrium, the laws of force which operate between the alpha particle and the charged nucleus, and the nature of nuclear structure. On the basis of experiments on aluminium and uranium, Sir Ernest Rutherford put forward the hypothesis that each nucleus of an atom is surrounded at a little distance by a circle of electrically charged doublet-satellites—a sort of Saturn's ring—continually rotating. It was, however, easy to get on an entirely wrong track, and to make illusory discoveries, a good deal harder to disprove than to make. Patient investigation has been undertaken by Mr. Blackett, under Sir Ernest Rutherford's direction, and a long series of photographs of bombardments have been produced by an automatic camera device, whereby the tracks of half a million alpha particles have been studied. Now and then a disintegrating collision has been observed, and the story of it has been read in the scattering and deviation of the straight luminous lines on the photographic plate. So far it has not been possible to say what happens to the alpha particle after its collision with the nucleus. Sir Ernest Rutherford suggests, on the basis of eight photographs which have been obtained of a disintegrating collision between the alpha particle and the atoms of nitrogen, that the alpha particle may be captured by the nucleus as a result of what would be called in military strategy an encircling movement. A proton is ejected, and its fainter track can be discerned; but unless, in Sir Ernest Rutherford's words, an unseen electron has "dodged off," the alpha particle which is driven into the recoiling nucleus is imprisoned within its system. The result of bombardment by alpha particles, therefore, may be a synthesis, a building up or replacement, rather than a disintegration, in the case of a light nucleus. But years have been spent upon this study, and more years will have to be spent before the riddle of atomic architecture is solved. The term "proton"—meaning rudiment—has been borrowed by the physicists from the biologists.

MEMORIAL TO SIR WILLIAM MACEWEN.

WE published last week (p. 615) the first list of subscribers to the fund to establish a memorial in Glasgow to Sir William Macewen. The amount announced in the list was £1,550, or about half that desired to carry out the three objects of the memorial—namely, a bust for the University with a replica for Lady Macewen, a Macewen memorial lectureship, and a Macewen medal or prize in surgery for students. We feel sure that many members of the British Medical Association, remembering Sir William Macewen's great services to it, will be anxious to subscribe. They may send their gifts to the Financial Secretary of the British Medical Association (Mr. L. Ferris-Scott), 429, Strand, London, W.C.2, who will forward them to the treasurer of the fund, Mr. James Macfarlane, D.L., LL.D., Wesleyan Street, Glasgow, S.E. Cheques and postal orders should be made payable to the Sir William Macewen Memorial Fund.

BRITISH CONGRESS OF OBSTETRICS AND GYNAECOLOGY.

WE announced three weeks ago that the fifth British Congress of Obstetrics and Gynaecology would be held in London on Wednesday, Thursday, and Friday, April 22nd, 23rd, and 24th, under the presidency of Dr. H. Russell Andrews. It has been promoted by the Section of Obstetrics and Gynaecology of the Royal Society of Medicine, London, the Edinburgh Obstetrical Society, the North of England Obstetrical and Gynaecological Society, the Midland Obstetrical and Gynaecological Society, the Section of Obstetrics and Gynaecology of the Royal Academy of Medicine, Dublin, and the Ulster Medical Society. The chairman of the executive committee is Dr. T. W. Eden, and the treasurer is Mr. T. G. Stevens; the other members are Professor W. Blair Bell (Liverpool), Dr. R. W. Johnstone (Edinburgh), and Professor Sir Ewen J. Maclean (Cardiff). The official guests are Professor J. Whitridge Williams (Baltimore) and Professor W. W. Chipman (Montreal). The meetings will be held at the house of the Royal Society of Medicine. The meetings in the morning and afternoon of the first day will be devoted to a discussion on the prognosis and treatment of puerperal sepsis. Two reports on the subject have been drawn up—one by a committee of the Section of Obstetrics and Gynaecology of the Royal Society of Medicine, and the other by a committee of the North of England Obstetrical and Gynaecological Society. Copies of these reports can be obtained from Mr. Clifford White, one of the honorary secretaries of the Congress, if application is made to him before April 10th. At the morning session communications will be made by Sir Ewen J. Maclean on puerperal sepsis in Wales and by Dr. Gibbon Fitzgibbon and Dr. J. W. Bigger on a clinical and bacteriological investigation of puerperal fever, and Dr. L. P. Lockhart will relate the results of bacteriological examinations during pregnancy. A discussion on puerperal sepsis will be opened in the afternoon by Professor J. Whitridge Williams. At the morning and afternoon sessions on Thursday and at the morning session on Friday individual papers will be read; on the afternoon of Friday operations will be performed at most of the principal hospitals. A pathological exhibition will be open during the whole of Thursday and Friday, and members who wish to exhibit specimens are requested to communicate at once with the secretary of the pathological committee of the Congress, Dr. Everard Williams, 5, Wimpole Street, W.1. There will be a luncheon on Wednesday, and in the evening the President and Mrs. Russell Andrews will hold an "at home" at the Royal Society of Medicine. The Congress dinner will take place on the evening of Thursday. Further particulars can be obtained from the honorary secretaries, Mr. Clifford White, F.R.C.S., 62, Harley Street, W.1, and Mr. J. Barris, F.R.C.S., 50, Welbeck Street, W.1.

THE THERAPEUTICS OF RADIUM.

THE EXPERIENCE OF THE RADIUM INSTITUTE, LONDON.

THE first hint of the radio-active properties of certain elements was obtained by M. Henri Becquerel of Paris. Professor Röntgen had made his memorable discovery of the *x* rays in the previous year (1895). Becquerel was interested in phosphorescence, and asked himself whether phosphorescent light was entirely stopped by opaque objects, or whether in part it consisted of invisible penetrating rays, like the *x* rays. By great good fortune the phosphorescent body he chose was uranium. He wrapped a photographic plate in black paper and placed the phosphorescent substance on it and then exposed it to sunlight. The photographic plate beneath the substance was dark, showing that it was giving out rays that, unlike sunlight, were capable of penetrating the black paper. Becquerel then discovered that the darkening of the plate wrapped in the black paper occurred as much in the darkness as in the light. It was then ascertained that three different types of rays were given out by the radio-active substance; they were called the alpha, beta, and gamma rays. The next step was the discovery (1898) by Madame Curie and her husband and G. Bémont of radium, an element over a million times as radio-active as uranium. The *x* rays had already been applied in diagnosis and therapeutics, and it was not long before radium also was used for these purposes.

The Radium Institute in London was founded on the initiative of King Edward VII, and with munificent gifts from Sir Ernest Cassel and the Earl of Iveagh. The building specially erected for the purpose in Riding House Street, Portland Place, was opened in August, 1911, and has since been enlarged more than once, the last addition having been taken into use at the beginning of this year. The Institute has been conducted on the lines of a charitable trust, no appeal being made for public support, but patients are expected to contribute within their means. For those able to pay for treatment in the Institute several private bedrooms were provided two years ago, and early this year two new wards for the treatment of necessitous patients were added. They provide four cubicles for women and three for men, and form part of a self-contained unit with a small operating theatre for the performance of minor operations—the "surgery of access."

The first report of the Institute, dealing with the period from August 14th, 1911, to December 31st, 1912, was published in its entirety in this JOURNAL (January 25th, 1913, p. 149). The report for the next year was published by the Institute itself as a pamphlet, and this has been the practice since. The reports have been fully analysed year by year in our columns, and the information they contained has been of great value to the medical profession, owing to the large number of cases treated and also to the candour and impartiality with which the results have been recorded by the medical superintendent (Mr. A. E. Hayward Pinch, F.R.C.S.). The previous annual reports have dealt with the work of the preceding year, have described the apparatus used and improvements made in it, have discussed the best methods of application, and have set out the lessons learnt under the heads of the various diseases treated.

"A CLINICAL INDEX OF RADIUM THERAPY."

This year a new departure has been taken, and Mr. Hayward Pinch and his assistants, Dr. Philip Gosse and Dr. Oskar Teichman, together with Dr. R. Douglas Reid (house-surgeon), have compiled what they have called *A Clinical Index of Radium Therapy*.[1] Dr. J. C. Mottram, director of the pathological laboratory, has contributed a chapter on the clinical aspects of the work of the research department, and Mr. W. L. S. Alton, F.I.C., director of the chemico-physical laboratory, another on the evolution of the present-day technique of the preparation of radium and radon apparatus. The first seven chapters are concerned with the physics of radium, its disintegration products and the rays emitted, with the use of applicators, with the local and general reaction, with the effect of radium rays on normal tissues, and with the fundamental principles of radium therapy; then follow ten chapters in which the application of the rays to diseased conditions is fully discussed, region by region. The volume is therefore of the nature of a textbook, and in what follows we will ask the reader to bear this in mind, for an attempt to review a textbook in detail is rather a thankless job. We shall pick out only a few points.

Radon.

In the first chapter, and in Mr. Alton's appendix, the methods of collecting, purifying, and bottling radium emanation, now called "radon," are stated in full. They have been greatly improved during the last few years, and two methods are fully described and illustrated—the one by chemical and physical separation, and the other a purely chemical method. The former is preferred at the Institute. In it the radon is collected in capillary glass tubes, which can be made of any convenient size and form. The smallest in use is 0.3 cm. long and 0.1 cm. wide, and is usually charged with between 1 and 2 millicuries of radon. Others are made up to 5 and even more centimetres long. These tubes are termed "seeds," and are buried in growths without any metal screening and allowed to remain there permanently. "Seeds" is perhaps not a very happy term, because, far from containing any promise for the future, the radon is rapidly disintegrating. This rapid loss of radio-activity is an objection to the use of radon, but the rate of loss is known; it falls to one-half in 3.85 days and to one-fifth in 8.5 days; during the first twenty-four hours radon loses exactly 16 per cent. of its activity. It is therefore a simple matter to prepare a radon apparatus the mean activity of which for twenty-four hours shall be equal to that of a radium salt apparatus of known strength.

"Supposing, for the sake of example, it is desired to give an exposure of twenty-four hours' duration with a radon tube, the activity of which will be equal to that emitted by 100 milligrammes of radium element. A radon tube is made with an initial radio-activity of 109-110 millicuries; by the end of twenty-four hours its value will have decayed to 92-93 millicuries, so that its mean activity for the whole period will be as nearly as possible equivalent to that of 100 milligrammes radium element."

According to Mr. Alton the use of radium for the production of radon applicators is becoming general abroad, especially in the United States, and we observe that the Middlesex Hospital has recently adopted it. Whether a radium or radon applicator is used is a matter of convenience, the therapeutic effect is identical, as was to be expected, since both depend for their efficacy on the same disintegration products. Modern institutions should be equipped with facilities for the employment of both types. According to Mr. Pinch and his colleagues the advantage of the general use of radon is that its intrinsic worth is small, so that if an apparatus is mislaid or stolen there is no pecuniary loss beyond the value of the container and screens. On the other hand, the radio-activity of a radium salt applicator is always constant for any length of time, and an apparatus if carefully handled needs little attention beyond repairs to its covering at long intervals. The radon applicator must be replaced every few days.

"Surgery of Access."

In an article published in this JOURNAL on January 17th last (p. 133) it was said that what is called "surgery of access" had been greatly developed; it is now, we are

[1] The Committee of the Institute has authorized the free distribution of the book to members of the medical profession. Copies can be obtained post free on application to the Secretary, Mr. Thomas A. Garner, F.C.I.S., Radium Institute, 16, Riding House Street, London, W.1.

told, the general rule in radium therapy that whenever the burying of a tube or tubes in a growth is possible this method of treatment should be adopted. If embedded in the centre of a mass the whole activity of the tube is effective, whereas if merely laid upon the surface of a growth little more than 30 per cent. of its rays come into action. Minor surgical operations are therefore performed to permit embedding, especially in the treatment of malignant disease of the breast, uterus, bladder, prostate, tongue, fauces, larynx, oesophagus, and stomach. The method is not suitable for growths of the parotid, carcinoma of the thyroid, and lympho-sarcoma of the neck, as all these show a tendency to fungate rapidly when any breach of the covering skin has occurred. In the other conditions enumerated the use of one or two large tubes containing from 25 to 100 mg. of radium element is being superseded by the use of many smaller tubes containing from 1 to 5 mg. In this way a more equal and effective radiation of the mass is obtained. The small size of the tubes enables them to be inserted rapidly and with the minimum of disturbance of the tissues and discomfort to the patient. The importance of getting the surface as surgically clean as possible before burying the tube is mentioned; thus in lesions of the mouth and fauces carious teeth should be extracted or stopped, and in carcinoma of the cervix it may be found advisable to keep the patient in the ward for some days to permit of thorough cleansing of the vagina and cervix, curettage of exuberant masses, and subsequent douching. In carcinoma of the bladder, if there is no cystotomy opening, tubes may best be inserted by means of a special operating cystoscope. In malignant disease of the oesophagus the introduction should always be performed under direct oesophagoscopy. When screen tubes of radium are buried in dense tissues a passage must be made with a tenotome or trocar, and for the introduction of the very small capsules of emanation a trocar and cannula can be used.

Reaction.

The chapter on reaction, though short, is highly important. The application of radium (or radon) is always attended by some reaction of the tissues, but its degree and extent varies, and the factors causing these variations are not well understood. There is such a thing as personal idiosyncrasy. In patients of a highly neurotic temperament the local systemic reactions are much more likely to be pronounced than in those of a phlegmatic type. Persons who freckle easily often develop pigmentation of the area treated after a lapse of several months. Age also makes a difference; the surface reaction develops earlier and is more intense in infants than in adults, and when treating infants for extensive capillary naevi it is advisable to proceed with great care until the degree of susceptibility has been clearly ascertained. Again, the reaction in patients suffering from locomotor ataxy, syringomyelia, paralysis, or any disease or operation affecting the functions of the trophic nerves is often excessive. For example, the elaborate and extensive dissection associated with the performance of Wertheim's hysterectomy appears to impair the vitality of the pelvic tissues, so that special caution must be exhibited in making exposures within two or three months after operation. Tissues which have previously received much treatment by *x* rays or ionization or have been cauterized or subjected to the action of carbon dioxide snow should be treated with much care, as any overdosage may result in excessive breaking down of the old scar tissue. General reactions also occur when a large quantity of heavily screened radium has been employed and prolonged exposures given. Such systemic reactions are best seen in the treatment of lymphadenoma, lympho-sarcoma, and sarcomatous growths generally. The symptoms are those of toxaemia. The key-note of all this chapter is the need for caution.

Speaking generally, the degree of reaction depends upon the apparatus, screening, and dosage employed, on the extent of the area treated, and on the nature of the tissue. Mucous surfaces are much more susceptible than the skin—the reaction appears earlier and lasts for a longer time. The skin reaction is less in a dry surface than in a moist; vesication occurs more readily in such situations as the axilla and inguinal folds than at other parts. Finally, carcinomatous or sarcomatous tissue does not display the same resistance to radium rays as normal cells, and it is upon the proper and correct appreciation of this fact that successful radium therapy in such cases largely depends. In a typical skin reaction, following upon treatment with unscreened or lightly screened apparatus emitting a large proportion of beta rays, four degrees may be distinguished: (1) simple erythema; (2) erythema followed by vesication; (3) vesication with superficial ulceration; and (4) deep ulceration generally followed by the formation of "limpet shell" radium crust beneath which repair takes place. The reaction in the skin usually begins to appear between the seventh and fifteenth days, and may never go beyond slight erythema. In other cases the interval may be longer—as much as three weeks. When radium or radon tubes are buried in the tissues the reaction depends largely upon the character of the screening; it is greater with thick screens, owing to the secondary radiations produced. Special means, therefore, must be taken for their absorption.

Fundamental Principles of Radium Therapy.

Given sufficient intensity and length of exposure the effect of radium emanations upon a living cell is, first, increase, then the arrest of cell activity, and finally a degeneration of the cell. These stages pass more quickly in a pathological condition than in a healthy cell. In radium therapy, therefore, the aim is to give such a dose and length of time as will cause the death of the pathological cell without appreciably affecting the functions and vitality of the normal cells. In this connexion the general condition of the patient is of importance, and cachexia militates against successful treatment. "Speaking in very general terms," we are told, "it is best to give a maximum dose at the first exposure."

The Treatment of Disease.

The remainder of the book, as has been said, deals with the treatment of disease, malignant and other, in various regions. There is a chapter on radium and internal medicine, which shows that this department of the subject is still in a rather empirical stage. The book will without doubt be, as its authors hope, of great use to general practitioners in enabling them to recognize the possibilities and limitations of radium therapy. No extravagant claims are made. The repute of radium therapy, it is truly said, has suffered from the irrational enthusiasm and unthinking expectations which so often attend the appearance of a new remedy, but it cannot be denied that radium as a therapeutic agent has great power. The preface concludes with the following modest statement: "With increased knowledge and improved technique it may be hoped that the time will come when the word 'cure' may be used deliberately and justifiably with regard to the radium treatment of a constantly increasing number of cases of malignant disease."

RADIUM IN DUBLIN.

AT a meeting of the Section of Surgery of the Royal Academy of Medicine in Ireland, held on February 27th, MR. SETON PRINGLE in the chair, MR. WALTER C. STEVENSON gave a summary of radium treatment in Dublin during the year 1924.

Mr. Stevenson had treated altogether 174 patients, 105 of whom were suffering from malignant and 69 from non-malignant conditions. He employed mostly radium emanation in glass capillary tubes, supplied by the Irish Radium Committee, supplementing this with 53.53 mg. radium element in six capillary metal tubes. Since, in the majority of cases of malignant disease, treatment was symptomatic only, many cures could not be expected, yet many gratifying results had been obtained. Excluding 5 rodent ulcers cured, an apparent cure or the complete arrest of the disease was obtained in 15 cancers (1 lip, 3 tongues, 1 antrum, 4 breasts, 1 body of uterus, 5 skin cases) and 4 sarcomas of the neck and 1 of the thigh. He gave full details of the treatment in one case of apparent cure of cancer of the tongue, and indicated the doses employed in several other conditions. He emphasized the better results obtained by using larger quantities of radioactive material and distance pieces, which enabled a larger

dose to be administered and absorbed by the tissues in a more uniform manner. In non-malignant conditions the effect of radiation, continued for a long time, was most marked. In two cases of tuberculous peritonitis there appeared to be a complete recovery. Many scars, painful and otherwise, were treated with good results, and patients with painful stumps following war injuries were enabled to wear their artificial limbs. Among the non-malignant cases treated with satisfactory results were actinomycosis, corns, Dupuytren's contraction, fibroids of the uterus, fissure of the tongue and lip, Hodgkin's disease, keloid, lumbago, neuralgia, osteo-arthritis, pruritus ani, sinuses and ulcers, sciatica, spring catarrh, and warts. Mr. Stevenson also demonstrated his radium apparatus, consisting of brass boxes, needles, and series of six brass tubes of various sizes with interchangeable blunt, olive-pointed, and trocar-pointed ends. By the use of extension pieces, made up of short lengths marked in centimetres, which screwed into one another and into the radium container, a series of tubes or needles could be inserted into a tumour from end to end. Systematic radiation was obtained by introducing the radium at intervals into untreated areas, segments of the extension piece being screwed off as they appeared at the skin level. Tubes and needles were easily inserted trocar-fashion, the skin being first stabbed with the point of a knife. He also showed an aluminium distance piece for vaginal and rectal work, and an apparatus for fixing the wire screwed into a radium tube in the oesophagus; the radium could thus be moved as required without disturbing the patient or the dressings.

Dr. M. R. J. HAYES, reviewing his cases in 1924, stated that the treatment of rodent ulcer by radium gave excellent results. With correct dosage and filtration one application usually sufficed; the scar was scarcely perceptible and recurrences were rare. Rodent ulcers on the eyelids should receive fractional repeated doses rather than a single full application, since severe conjunctival reaction and photophobia followed massive doses in this region. The eye should be carefully protected by adequate filters from unnecessary and harmful radiation. If the ulcer had invaded bone or cartilage radium would not cure it, and the invaded tissue must be excised. Of 27 cases treated in 1924, 23 had healed and 4 were still under treatment. Two early cases of carcinoma of the lip and two recurrent cases healed rapidly after surface applications of radium. The cervical lymphatic glands were simultaneously irradiated, whether enlarged or not. Patients with inoperable and advanced carcinoma of the floor of the mouth were benefited, and although a cure could not always be expected the advance of the disease was retarded, and there was considerable relief from pain and suffering. Seven inoperable cases of carcinoma of the os and cervix uteri had been treated, and all were improved, pain, haemorrhage, and fetid discharge being arrested. Two patients died within a few months from metastases in other organs. One, aged 63, who was first treated in July, 1921, was still alive and healthy, and the disease had been kept in check. Since the maximum effect of radium was local the high-voltage *x* rays were better than radium rays in obtaining uniform and homogeneous distribution of irradiation at depths inaccessible or dangerous for the implantation of radium needles. Three cases of fibrosarcoma and one of osteosarcoma showed considerable improvement after treatment. An inoperable case of carcinoma of the rectum in a man, aged 43, who had had colostomy performed in 1923, was treated by radium in December, 1923. Following this his pain, tenesmus, and discharge disappeared; he had put on weight, and was now able to perform his daily work without any discomfort or inconvenience.

Mr. H. H. POOLE referred to the relative efficiency of radium and *x* rays with regard to deep *x*-ray therapy. From the physical point of view, he supposed that the therapeutic action was purely a question of ionization, the only difference being that gamma rays were harder than any *x* rays that could be produced. The beta rays produced by radium were of a much higher velocity, and had a greater penetration than those produced by *x* rays; gamma rays were probably better for absorption. The real difference between the action of *x* rays and the action of beta rays was that with *x* rays a very large amount of energy was available, and a much more uniform depth was obtainable, though with radium a somewhat similar effect could be obtained by large surface doses spread over a wide area of skin. The ionization produced by beta rays was approximately one hundred times greater than that produced by gamma rays, the reason being that the ionization was all concentrated in such a small depth.

Mr. S. PRINGLE said that the results obtained by radiologists were improving every day, and cases in which it would have been impossible to recommend any treatment at all five years ago were now being treated by *x* rays and radium. In some of them the results were quite good, and he thought that better results could be hoped for in the future. It was only in comparatively superficial growths that a good result could be expected, though with the deeper growths the results were encouraging. Very few real cures could be hoped for from radium or even from deep *x*-ray therapy, but he believed that with improved technique and greater knowledge it would be possible to deal with conditions that were at present outside the scope of treatment. He always radiated his patients who had suffered from cancer of the breast. Patients had been kept alive by means of *x* rays before radium had been used, and their pain had been relieved for many years; in some cases the growth disappeared altogether but recurred some time later. He thought that in the future, when once the primary growth had been removed, the prophylactic post-operative treatment by *x* rays and radium would be greatly improved.

Mr. W. C. MACFETRIDGE thought all cases of rodent ulcer of the eyelids should be treated by radium, if the ulcer was at all large. He had treated four cases of rodent ulcer recently; in one the ulcer was very small, and he excised it, which was the right treatment if the ulcer was small and could be excised without producing any deformity. In most cases, however, the ulcer was too large for excision, and radium was the treatment employed. Cases had been reported in which damage had been done to the cornea and the lens, but he, personally, had not seen a case in which this had occurred.

Dr. D. J. CANNON referred to the treatment of skin cases by *x* rays and radium; in Vienna the treatment was largely used, with very good results; it had to be continued for a long time. He thought that radium was pre-eminently successful in cases of gynaecological haemorrhage and some cases of fibroid. Haemorrhage which resisted all other forms of medication could be cured by one application of radium or *x* rays. This treatment, however, should not be used in patients who were suffering from pressure symptoms as well as from haemorrhage. He had recently had a case of haemorrhage occurring ten years after the menopause, and he suspected carcinoma. There was no evidence of degeneration and no pain, only haemorrhage. After one dose of radium the patient was cured and had no recurrence of the haemorrhage. The etiology of haemorrhage in young women was obscure; hypofunction of the ovary was suspected. These cases were sometimes cured by small stimulating doses of *x* rays.

England and Wales.

HEALTH ADMINISTRATION IN LONDON.

AT its last two meetings the London County Council has had before it the lengthy report of a special committee on health administration in London, over which the new chairman of the Council, Captain Oscar Warburg, has presided. In view of a recent statement by the Minister of Health that he was giving attention to a new health bill, the time seemed opportune to the committee to consider problems awaiting solution in respect to London health services. A report was made to the Council by a similar committee in 1919, offering suggestions as to the general lines of a scheme for the better organization of such services, but only two important changes in that direction have since been effected. One is that by the combined operation of the National Insurance Act, 1920, and the

Public Health (Tuberculosis) Act, 1921, the legal responsibility for the institutional treatment of tuberculous insured persons has been transferred from Insurance Committees to local authorities, which were already responsible for the institutional treatment of tuberculosis in respect to the remainder of the population. The other is the formation of voluntary hospitals committees, as recommended by Lord Cave's committee, and the acceptance by King Edward's Hospital Fund of the functions of voluntary hospitals committee for the metropolis. Otherwise no special progress has been made towards the co-ordination of health functions during post-war years. No action has yet been taken to remove the anomalies and inconveniences arising owing to the Poor Law medical service being administered separately from the health services under municipal authorities. This is one of the questions awaiting national solution. The view of the committee is that the health functions of London Poor Law authorities should be divided between the County Council and the borough councils, and the Poor Law institutions transferred to the ownership and management of the County Council. It would then be possible for the Council, after conference with the King Edward's Hospital Fund, to advise the Minister of Health as to the total hospital provision to be made by public authorities. Other matters awaiting a national solution included the legislation on the use of preservatives and colouring matters in food, the amendment of Part I (infant life protection) of the Children Act, the tightening up of the Cleansing of Persons Act, regulations for the more effectual perflation and ventilation of places of public entertainment and the exclusion of children therefrom as a precautionary measure when necessary against the spread of epidemic, endemic, or infectious disease, and the revision and codification of the existing enactments with regard to serious emissions of smoke. Certain local problems which involve other authorities besides the County Council include the disposal of house and other refuse as it affects the development for residential or industrial purposes of certain lands on the eastern outskirts, and the disposal of sewage from London and adjacent areas draining into the Thames. Of the problems affecting particular services the most important is the development of a comprehensive scheme for the treatment of tuberculosis. An early settlement as to the future of Poor Law infirmaries would advance the solution of the problem of making proper provision for advanced cases of tuberculosis, for the infirmaries could be utilized in part for residential accommodation. Inquiry is to be made into various questions of tuberculosis after-care, in particular the establishment of workshops, and the Council is to give evidence before the Royal Commission on National Health Insurance to the effect that insurance funds might suitably be applied towards approved work centres and other assistance for tuberculous persons. General health propaganda work has developed considerably in London during the past few years, and the committee recommends a further extension of the powers of the Council in this respect, also further periodical surveys—such as that now proceeding on the provision of treatment and education of children suffering from encephalitis lethargica—and periodical conferences with other authorities working in the same field. A number of recommendations were appended to the report, calling for action by the Government on the various matters above set out so far as such action was necessary to effect them. After some Labour criticism on the ground that the proposals were not sufficiently comprehensive and definite, the recommendations were carried.

The Liverpool School Laboratory at Sierra Leone.

On the eve of their return to Sierra Leone to resume work as director of the Sir Alfred Jones Tropical Research Laboratory, Professor D. B. Blacklock and Mrs. Blacklock were the guests of Sir Francis and Lady Danson at luncheon at the Exchange Station Hotel, Liverpool, on March 20th. In the absence of Sir Francis Danson, who was detained in London, Dr. Richard Caton, chairman of the Liverpool School of Tropical Medicine, presided. He said that the luncheon was given for the purpose of bidding good-bye to Professor and Mrs. Blacklock, who were returning to Freetown, where they were doing excellent work in tropical research. Dr. Caton said that the work carried on by the Liverpool school, which owed its foundation to the late Sir Alfred Jones, was of great benefit, not only to Europeans who resided in the tropics, but also to the native population. Every endeavour was being made to make the tropics more healthy, and thus improve the conditions under which trade could be carried on. The Lord Mayor of Liverpool, speaking as a commercial man, said that thanks were due to those who went out at the risk of their lives in the interest of science and for the benefit of future generations. He hoped that the money necessary for the maintenance of the laboratory—about £2,000 a year—would be shortly forthcoming. Professor Blacklock gave an account of some of the work conducted at Sierra Leone. During the last eighteen months the first subject investigated was schistosomiasis, and with Mrs. Blacklock's help he had been able to determine the species of snail which transmitted it. Two expeditions had been made for the investigation of goitre and to study the sanitation of native villages. Great improvements in the villages might be expected if the native could be educated to develop the natural resources of the country. As it was the sanitary conditions were very bad and the infantile mortality high. The best way to educate the native in hygiene was by demonstration, and that was what the school was endeavouring to do.

Birmingham General Hospital.

On March 29th, 1924 (p. 596), we referred to the urgent need of increased accommodation for the Birmingham General Hospital. During the past year definite advance has been made in this direction. It is proposed to obtain the upper half of an adjoining churchyard for the erection of new buildings, and negotiations have been in progress with the Bishop, the City Council, and other authorities. It has been found necessary to promote a private bill to give authority for the demolition of the church, to close a street, and to remove human remains. The bill in question is still before the House of Lords, and it is hoped that parliamentary sanction will soon be obtained. The approval of the Bishop and the City Council was given, and the Executive Committee of the Hospital Saturday Fund, after a careful examination of the very urgent need of the hospital at the present time, and of its inability to undertake a larger scheme, have now agreed that the present proposals should be adopted in their entirety. The board of governors of the hospital has decided that the provision of more operating theatres should be taken in hand at once in order to lessen the congestion due to the attempt to treat a large number of urgent surgical cases. It is hoped that actual building may be begun shortly, the cost (£7,000) of this part of the extension being provided from the invested funds of the hospital. The annual report of the hospital shows that during the past year the number of in-patients was 6,868, as compared with 6,153 in the previous year; the number of out-patients had similarly increased, from 47,696 to 51,777. More than 7,000 operations were performed in 1924. The income for the current year was £68,000, the expenditure £73,000. An increase in income has occurred each year for ten years in succession; the present deficit is due to the fact that the amount received from legacies in 1924 was considerably less than in the previous year.

Mill Road Infirmary, Liverpool.

Three new departments, including an operating, an x-ray, and an electro-therapeutic department, were opened on March 24th, at the Mill Road Infirmary, Liverpool. The scheme of the operating department was devised by Dr. R. T. Bailey, medical superintendent, and Mr. O. Herbert Williams, visiting surgeon. This building is on the ground floor in a courtyard between two ward blocks. Around a central octagonal compartment, large enough for the simultaneous reversing in it of two ward ambulances, are two operating theatres and anaesthetic rooms, an instrument sterilization room, a laryngological theatre, and a cystoscopy room. A dressings sterilization room, a store room, a robing room for the surgeon and assistants, with a shower bath and lavatory and a robing room for nurses, are also provided. Each of the operating theatres is

25 feet long by 16 feet broad, and is lit by a north light; the central octagonal space is lit by a dome. The artificial lighting is designed to eliminate all shadows, and special attention has been paid to avoiding all sharp corners throughout the new buildings so that rigid surgical cleanliness may be obtained. The new building will be of great value to the infirmary, which contains 900 beds, and dealt with 7,000 patients in the course of last year.

Scotland.

THE ABERDEEN HOSPITAL FOR SICK CHILDREN.

A well equipped pediatric department is so important a constituent of a school of medicine that the resolve of the managers and staff of the Royal Aberdeen Hospital for Sick Children to erect a new building will be universally applauded by the medical profession. Old Aberdeen graduates will know that the project is overdue. A site was secured as long ago as 1814, plans had been drawn up, and £20,000 out of the £35,000 believed at that time to be necessary for the building had been received, when the scheme had to be suspended owing to the outbreak of war. The scheme was revived in 1919, and considerable progress towards obtaining the capital sum required was made, but the cost had then advanced to £70,000. The delay has not been altogether an evil thing, because it has now been possible, with the help of the Committee of the Joint Hospitals Scheme and the goodwill of the town council, for the directors to buy a fine site at Forresterhill. But the realization of the architect's plans will, at present prices, cost £110,000, and of this amount £45,000 remains to be raised. The plans show four ward blocks, an isolation block, and *x*-ray and out-patient departments; the site affords space for further extension. The wards face south-east; the administration department is to be on the north side, as also the nurses' home, the front of which will, however, look to the south-east. There are only three sick children's hospitals in Scotland—one in Edinburgh, one in Glasgow, and that in Aberdeen. In the present hospital in Aberdeen 32,000 patients have been treated, and every Scottish county from Forfar to Caithness, including Orkney and the Shetland Islands, has contributed patients. The staff, through the letter signed by Mr. Alexander Mitchell, surgeon to the hospital, published at page 680, appeals to old residents and old graduates to help. Contributions, marked "Staff Fund," may be sent to Miss Hill, superintendent of the hospital.

CAMPAIGN AGAINST RATS.

An intensive campaign against rats opened on Monday, March 30th, and is to last for a week. It has general support from local authorities, who have undertaken to supervise the operations. Railway companies and the naval and military authorities throughout Scotland have also agreed to take special action. Poisoning, trapping, gassing, and ferreting are the special means extensively practised, and a special effort is being made in connexion with public sewers, sewage works, refuse bins, and other breeding places of rats. Special attention is also paid to the rat-proofing of buildings, as regards defective ventilators, holes under doorsteps, and crevices in external masonry. As the number of rats in any locality is directly proportionate to the food supply available to them, garbage and refuse are, as far as can be, removed or destroyed, so that the maximum benefit may be derived from the campaign. It is estimated that the cost of the destructive activities of rats cost the country somewhere about fifteen millions sterling a year, and the rat is well known to be a potential danger to the public health.

THE PROBLEM OF MALARIA.

Professor J. H. Ashworth presided over a meeting of the Royal Society of Edinburgh on March 23rd, when Dr. Andrew Balfour, C.B., C.M.G., Director of the London School of Hygiene and Tropical Medicine, gave an address on malaria, which, he said, had acquired fresh importance in this country, owing to its use as a therapeutic agent in general paralysis, and also because there was at the present time a certain amount of danger that biology and medicine might be treated in separate, water-tight compartments. The problem of malaria demonstrated very effectively the close association between the two studies. Dr. Balfour went on to consider the question of geographical distribution with reference to the case of Scotland; the early prevalence of malaria in Scotland was described and probable reasons for its decline suggested. An anopheline mosquito still abounded in Scotland, and it was quite possible that indigenous cases of malaria still occurred. A combined mosquito and malaria survey might be useful, at all events from the scientific and academic standpoint. The reasons why malaria causes death were considered, and special emphasis was laid on the condition of liver failure, which often occurred. The influence exerted by malaria upon industry and the economic welfare of a country were also considered, as well as the curious immunity which was shown by lower animals to the parasite of human malaria. Reference was made to the introduction of stovarsol as a rival to quinine in the treatment of malaria, and in connexion with the problem of periodicity it was pointed out that, although a great deal of work had been done, the prevalence of malaria still remained a most elusive question. The lecture was illustrated by a cinematograph film supplied by the Rockefeller Foundation.

GLASGOW CANCER HOSPITAL.

The thirty-fourth annual general meeting of subscribers to the Glasgow Cancer Hospital was held on March 23rd, under the chairmanship of Sir J. Macleod, Bt. Lord Provost Montgomery, in moving the adoption of the annual report, said that he knew no work which commended itself more to the people of the city. He believed that cases of cancer were on the increase, and greater facilities for research were required in the hospital; for this reason he appealed for increased financial support. Sir George T. Beatson, senior surgeon of the hospital, in seconding the adoption of the report, said that the primary object with which the hospital had been founded was very faithfully fulfilled, and the directors had decided that to carry on the work of research satisfactorily there should be built up a special fund of at least £20,000, which would furnish, along with Government and other grants, an income that would meet the current expenses of this department. Towards this sum nearly £12,000 had been already collected, and one donor had promised the final £1,000 as soon as £19,000 had been subscribed. The real cause of cancer was still unknown, and the disease was largely on the increase, especially in regard to cancer of the digestive canal. Nevertheless, important advances in knowledge had been made in recent years, and, thanks to anaesthetics and antiseptics, increased success attended early operative treatment. In inoperable cases valuable aids to treatment were being found in radium and deep *x*-ray therapy. He urged that the general public should get rid of the idea that cancer was incurable by operation, and also that it was necessarily accompanied by intense suffering, and should take a hopeful, consolatory view. Professor D. Noël Paton said that the present aim of research work was to find out the nature of cancer and its cause. The discovery of the cause might come from some small laboratory, as many discoveries had come in this way.

VETERINARY EDUCATION IN SCOTLAND.

A protest made by the Royal Faculty of Physicians and Surgeons of Glasgow in reference to the proposed withdrawal of the Government grant from the Glasgow Veterinary College was noticed in our issue of March 21st. A further protest was made at a public meeting held in Glasgow on March 25th. The point at issue appears to be that a departmental committee on agricultural education reported that the maintenance of two veterinary colleges in Scotland was, from a purely educational point of view, unnecessary, and that in view of the relative circumstances of the two existing colleges the grant of State assistance to the Glasgow College should be discontinued. Lord Provost Montgomery presided at the meeting, and in opening the proceedings said that he regretted the proposed discontinuance of the college as an inconvenience to students. In fact, it would be impossible for

a number of students resident in the West of Scotland to attend a college in Edinburgh. Professor Glaister, chairman of the governors, in stating the case for the Glasgow College, said that the meeting could be regarded as a protest against the Government and against its administrative body, the Board of Agriculture for Scotland, in regard to its intention to extinguish an institution in Glasgow which, during sixty-five years, had been doing work in furthering the interests of veterinary science. The trend of one section of public feeling favoured the centralization of veterinary education in Edinburgh. He pointed out that, with regard to the amount of financial assistance given by the State to the Glasgow and Edinburgh Veterinary Colleges respectively, the figures were: for 1922-23 £900 and £3,000, for 1923-24 £1,000 and £3,225, and for 1924-25 the estimates were £1,037 and £3,589. Sir Charles Cleland moved a resolution protesting against the action of the Board of Agriculture for Scotland; the college was a distinct educational asset, both from its past history and from the possibilities for the future. The Education Authority of Glasgow made a contribution towards the funds of the college annually, and it seemed to the authority that it would be ridiculous to be compelled by force of circumstances to contribute a similar or larger sum to Glasgow students, who would be forced to leave their native city and seek instruction in the East of Scotland. He did not think that in a city like Glasgow the public should permit such a useful institution to close its doors. The resolution was seconded by Mr. Gavin Hamilton, Lesmahagow, Convener of the County of Lanark, who said his council unanimously supported the continuance of the college. The resolution was adopted, and it was agreed that copies should be sent to the Prime Minister, the Secretary for Scotland, and the members of Parliament for the city of Glasgow.

Edinburgh Dental Hospital and School.

The thirty-third annual general meeting of the Edinburgh Dental Hospital and School was held in the hospital on March 20th, under the chairmanship of Dr. William Guy, F.R.C.S. It was stated that the work done in the hospital during the past year comprised a total of 12,703 conservation cases (fillings, inlays, dressings, and scalings), 1,237 cases under prosthesis, and 19,325 extractions; 1,005 skiagrams were taken. During the year 112 students had attended, as compared with 100 in the previous year. Reference was made to the building operations for the extension of the hospital and school now in progress; the Dental Board of the United Kingdom had promised a contribution of £5,000 towards the cost of this extension and a further sum of £1,000 for equipment; the Edinburgh Town Council had made a grant of £200 per annum for five years, or £1,000 in all, towards the cost, but a further sum of £12,000 would be required to cover the cost of furnishing, equipment, etc. Dr. W. Robertson, medical officer of health for Edinburgh, who moved the adoption of the report, said that the connexion between a public health department and an institution like the Dental Hospital was very close. Nearly all the ills that flesh was heir to were traceable to bad digestion, and if the teeth were properly attended to the people would not only be healthier, but also more contented.

Ireland.

Ulster Medical Society.

A meeting of the Ulster Medical Society was held in the Medical Institute, Belfast, on March 19th, to hear an address from Lieut.-Colonel L. W. Harrison, D.S.O., M.B., director of the V.D. Clinic, St. Thomas's Hospital, London, and to witness a cinematograph demonstration of the diagnosis and treatment of gonorrhoea. Dr. Cahill, vice-president, was in the chair in the absence of Dr. Darling, who, a few days earlier, had met with a motor accident. His car overturned, and though he suffered no serious injury he was confined to bed for a short time; when allowed to get up he was not able at once to return to full work. Colonel Harrison gave a clear and illuminating exposition, which was closely followed by all present and much appreciated. Professor Fullerton proposed, and Professor Lindsay seconded, a very hearty and warm vote of thanks on behalf of the society to Colonel Harrison, which was passed with acclamation.

Royal Victoria Hospital, Belfast.

The annual meeting of the Royal Victoria Hospital, Belfast, was held in the King Edward Memorial Hall on March 23rd, when the one hundred and thirty-second annual report of the board of management was presented. Lord Londonderry presided, and there was a large attendance. The financial statement showed an income of £53,914, and an expenditure of £54,424; this small deficit was considered most satisfactory having regard to the abnormal conditions prevailing. The hospital, it was pointed out, owed a deep debt of gratitude to their financial authorities, and to the superintendent (Colonel Forrest), the matron (Miss Musson), and all who worked so diligently for the welfare of the institution. The cost of each occupied bed was £140 a year. The expenditure on the new buildings and wards and their equipment would be £120,000, and an additional income of £11,000 a year would be required for upkeep. This was a serious responsibility, but the board was determined to keep the hospital thoroughly up to date and worthy of the town and province. The chairman referred with great satisfaction to the magnificent response of the workpeople, which amounted to nearly £20,000 for 1924, and to the noble bequest of the late Mr. Musgrave, some £56,000. Mr. Mitchell, chairman of the medical staff, proposed, and Dr. Morrow seconded, the adoption of the medical report, which stated that the numbers in all departments were increasing; the waiting list still grew in spite of all efforts to provide adequate accommodation. In addition to the medical students there were now twenty-five dental students; the new dental department was in full swing and doing an immense amount of good. Twenty-four probationers had entered and passed the first preliminary State examination for the registration of nurses. The board had, on the recommendation of the medical staff, increased both the permanent and the auxiliary staff again and again; the pathological, biochemical, and radiological departments were all working at high pressure. A body of young volunteer adults had now been organized throughout the town, who were now tested and ready to give their blood when transfusion was required. After much routine business had been transacted, the chairman of the board of management, Professor Lindsay, who was elected chairman for the seventh year in succession, proposed a hearty vote of thanks to Lord Londonderry, which was carried by acclamation.

Maintenance of Dublin Hospitals.

That the imposition of a tax for the upkeep of hospitals on people who could afford to give was a proposition worth considering, was the declaration of the Provost of Trinity College, Dublin (the Most Rev. Dr. Bernard), at the annual meeting of the Royal Victoria Eye and Ear Hospital. He did not, he said, believe the deficit in the accounts of the hospital could be made up by an increase in voluntary subscriptions. He was not sure that the time had not come for some kind of tax to be imposed upon the public for the upkeep of institutions of that kind. How, he asked, were they to pick out the people who were best able to give? The people who went to the theatre? Entertainment tax was put upon them. People who kept motor cars? If a person was able to keep a motor car, he or she ought to be able to pay something for the upkeep of the great hospitals of Dublin. The Eye and Ear Hospital was a national institution; its work was not confined to Dublin, and consequently it should appeal to the public in a way in which a local hospital, however good, could not. The report states that 1,702 patients were admitted and occupied beds for a period equal to 29,593 days, giving an average of 89.52 beds occupied daily. In the out-patient department 8,119 new patients were registered and 3,256 attended for further treatment, making a total of 11,375. The total ordinary income for the year was £7,980, and

fell short of expenditure by £2,836. Legacies received during the year had to be allocated to the current account instead of to capital, with the result that unless some great reduction was made in ordinary expenditure, or some great addition to ordinary income, the overdraft would be very heavy. A comparison with the previous year showed a reduction of nearly £2,000 in income. The bequests amounted to £900. In moving the adoption of the report, Sir George Roche, president of the hospital, said that for the previous year the deficiency was only £63 odd, while for the past year it had increased to £1,553. He was sure that when that fact was brought home to the charitable Irish public the hospital would not appeal in vain. The figures quoted in the report showed the splendid voluntary work that had been done by the medical staff of the hospital, and that was all the more surprising when the smallness of the staff was considered. Supporters had learnt with pleasure that recently an order had been made by one of the judges declaring that the hospital was entitled to the fund available under the terms of the will of the late Mrs. Harvey Lewis, amounting, he thought, to £21,000; this, he hoped, would enable an additional wing to be built and equipped with forty beds. Chief Justice Kennedy, in seconding, said the report was extremely creditable; the accounts ought to appeal to everyone who read them as an incentive to do something to help the enthusiastic band who were carrying on the great work of the hospital.

Medical Notes in Parliament.

[FROM OUR PARLIAMENTARY CORRESPONDENT.]

THE House of Commons has this week advanced a number of Government bills, including the Housing Bill, Housing (Scotland) Bill, and Town Planning Bill—three codifying measures which received second reading on March 31st. A debate arose that evening on accidents in mines, with special allusion to the Scotswood pit disaster. A resolution calling for legislation to strengthen the provisions of the Coal Mines Act, 1911, was carried without a division, and in view of the sympathetic attitude of all parties such legislation seems probable. There have also been debates on unemployment and on the British Empire Exhibition. The House of Lords has rejected Lord Banbury's Dogs Protection Bill.

Penalties on Doctors.

Minister of Health's Defence.

Mr. Herbert Williams asked the Minister of Health, on March 26th, why penalties of £10 and £20 respectively were imposed on two doctors who had been accused by the London Insurance Committee of gross negligence in cases of appendicitis and diphtheria respectively, but had been found innocent by a committee appointed by the Ministry of Health. Mr. Neville Chamberlain replied that misapprehension had arisen regarding these cases. The death of two insured persons in London in 1924 led to complaints being lodged with the London Insurance Committee in regard to the treatment received by them from the two insurance practitioners concerned. These complaints were investigated by the Medical Service Subcommittee of the Insurance Committee, which, with the concurrence of its medical members, recommended that in both cases a substantial deduction should be made from the doctors' remuneration. The Insurance Committee itself, however, regarded the cases as cases of gross negligence, and accordingly made representations to the Minister of Health, under the Regulations, for the removal of both doctors from the medical list. These representations necessitated the appointment of an Inquiry Committee. That Committee, consisting of a barrister and two medical practitioners, found that the allegation of "gross" negligence was not established in either case, but their findings of fact indicated that in one case the doctor had failed to exercise reasonable care, and that in the other case the doctor had failed to respond to a request to visit the patient at what proved to be a critical period in the illness. After careful consideration of the reports of the Committee he (Mr. Chamberlain) came to the conclusion that, while the facts established were not such as to warrant the removal of either practitioner from the medical list, there was abundant ground for the original recommendation of the Medical Service Subcommittee that grant should be withheld. There was no ground for the statement that the practitioners were found innocent. The procedure followed in these cases presented no exceptional features, but followed the practice of the Insurance Commissioners and of previous Ministers of Health.

Dogs Protection Bill.

In the House of Lords, on March 31st, Lord Banbury moved the second reading of the Dogs Protection Bill, which had been rejected by the House last year. He cited an opinion of the late Sir Lambert Ormsby that all that could be found out by physiological experiment of value to man had been discovered, and adduced letters from Sir William Collins and Dr. Nash which, he said, were in favour of his bill. He said that Sir Frederick Treves had declared that in dealing with man he had been hampered by prior experiments on the intestines of dogs. Lord Banbury said that when applying for licences for operations on horses, mules, and asses the applicant had to state that the operation could not be performed on any other animal. If anaesthetics were to be employed no such declaration was necessary for a licence to operate on dogs. Would Lord Knutsford agree to an amendment making such a declaration requisite? Two contradictory certificates were employed—one saying that the animal must be killed if the object of the experiment had been secured, the other that it must be killed if suffering severe pain or pain likely to endure. There were only two inspectors: how could they be present at any number of these operations? If not, who could be the judge of "severe pain" except the operator? The only protection which a dog had was the Act of 1886, as interpreted by the Home Secretary. He thought that the Act should itself lay down the conditions of experiment. He concluded by quoting an epitaph written by Lord Byron on a dog.

Lord Knutsford said he was told that since 1819 no motion for rejection of a bill had been allowed in that House, so he was compelled to move that it be read in a year's time. If this bill were to be brought in every year it would show that Lord Banbury's mind was not open to argument. He suggested that the stereotyped arguments for and against should be recorded for the gramophone so that they could enjoy them in the tea-room without wasting the time of the House. This was not a bill dealing with the question whether experiments should be allowed on animals, but whether dogs should be used for experiment. If the bill passed no experiment could be made on any dog, not even a feeding experiment to get rid of distemper. The whole physiological process of a dog was nearer to that of man than that of any other animal, except perhaps a monkey, and the whole medical and surgical world had never been so unanimous before as against this bill. The Royal College of Surgeons had declared that the bill would retard progress. Was that the attraction to Lord Banbury? Was there a subconscious awakening of his old instinct of obstruction? Other medical and surgical bodies had passed similar resolutions, and the Medical Research Council of the Privy Council had recorded its belief that the passage of the bill would put insuperable barriers in the way of some lines of research. Lord Curzon, when the bill was last before the House, had said that the scientific men of Oxford were against the bill, and the Royal Commission on Vivisection, from whom Lord Banbury had the hardihood to quote, had actually included dogs as suitable for experiment under the same conditions as horses. All were unwilling to use the dog, but recognized that it had to be done. The dictum of the late Sir L. Ormsby which had been quoted by Lord Banbury could not have been upheld had Sir Lambert lived till 1925, when insulin had been discovered and fresh discoveries were being made every day. The medical world did not deal with politics, and it was worthy of respect when it spoke unanimously on a subject such as this. Had the decision of the House last year been justified? Insulin had stood the test of time. Diabetes was no longer a sentence of death on boys and girls nor an intolerable burden on adults. That mitigation was entirely due to experiments on dogs. There were many other instances. During the past year progress had been made with the researches on distemper. Were experiments to be permitted to cure distemper, but not in the hope of saving human life? If there was a chance of benefiting mankind it seemed to him gross cruelty to refrain from gaining knowledge. England would be the laughing-stock of the whole world if it were to reject the opportunity to reduce suffering by research.

Lord Lambourne said he hoped to live to see two things: corporal punishment for offences against young children, and protection for the living body of the dog. The majority of experiments on the dog had been useless. There was no desire to hinder the greatest profession of the world. The objections of Lord Knutsford had been advanced to all previous Vivisection Acts, but despite the passage of those Acts had our surgeons fallen behind those of other countries in skill? The House of Commons would look upon such a bill as this with more favour at present than it had done for some time past.

Lord Mildmay confessed to astonishment that Lord Banbury had again ventured to bring forward this bill. He resented the implied imputation that opponents of the bill were inhumane. If he thought that those conducting research work were guilty of cruelty he would be up in arms in defence of the dog, but he thought that the campaign in favour of the bill had been conducted outside the House by unverified assertions and mere abuse. As the only member of the Medical Research Council in the House it was his duty to convey the opinion of that body. Its members authorized him to make known how strong and unalterable was their opposition to the bill as likely to impede the progress of medical science and the prevention of disease. The all-important discovery that rickets was a dietetic disease controllable irrespective of sunlight was entirely due to experiments on dogs. A short time ago one child in ten in the great cities suffered from rickets. Now it was reported to the Medical Research Council that a child so suffering could scarcely be found in London. He opposed the bill in the interests of dogs themselves. At the Medical Research Council's research farm at Mill Hill they were investigating the scourge of distemper. Were these experiments to be arrested, as they would be if the bill passed? The filter-passing agent of distemper was closely akin to the agent of influenza, and research into

animal and human disease could not be separated. The research was making progress, but results could not be announced till the third generation of immune puppies had been produced. Filter-passing agents were being attacked from many quarters with good promise of success, and success in one direction would lead to results, not only in foot-and-mouth disease, but in influenza, chicken-pox, and possibly rheumatism. In his association with those engaged in medical research he had been impressed by their real beauty of character, and he felt compelled to speak his admiration of the way they worked for the one object of diminishing pain and suffering. To describe them as "meddling in entrails with blood-stained fingers" was blasphemy. The physiologists were steadily reducing suffering in men, women, children, and animals.

Lord Rayleigh said the people who did research were a small minority of the medical profession, and so far as he could learn none of the medical men cited by Lord Banbury a year ago in support of his case had ever made any discoveries.

Lord Buckmaster said Lord Knutsford had spoken with an authority gained by a life unstintingly devoted to the noblest of causes. He spoke as a man keenly anxious to consider whether in the interest of humanity existing laws needed to be modified. Lord Banbury had not laid before them new grounds to justify bringing forward his bill again so soon. He had not presented a new argument or a new fact. Lord Banbury had not ventured to contradict the assertion that diabetes and rickets had been countered by experiments on dogs. The bill's real appeal was to people who objected to vivisection altogether. He asked the House to reject the bill so emphatically that they would not be troubled with it again.

Speaking for the Home Office, Lord Desborough said it was as opposed to this bill now as it had been last year.

The bill was rejected by 77 votes to 8.

Summer Time Bill.

In Standing Committee on the Summer Time Bill, on March 25th, Sir Henry Cautley moved an amendment to make summer time commence in future years as at present. Colonel Lambert Ward, in opposing the amendment, quoted the following passage from a letter from Sir Henry Gauvain: "It is not generally appreciated that towards the end of the winter many children are suffering from what may be termed shortly 'light hunger.' It is the spring light in the morning hours, when the air is clear and cool, and the heat rays are as yet unable to exercise their antagonistic action, that is especially therapeutically valuable."

The amendment was rejected, and the bill was reported to the House without amendment.

Pensions.

Late Development of Disability.—In reply to Mr. Stephen, on March 26th, Colonel Stanley said that the Minister of Pensions had seen no evidence to justify the suggestion that the seven years' limit for lodging claims by ex-service men for pension should be removed. This time limit had been embodied in the War Pensions Act of 1921 in accordance with medical advice. The Ministry was not getting many complaints about the limit. Mr. Beckett asked whether there were not many disabilities, such as heart trouble, which did not show when a man was young, but at a later age. Colonel Stanley replied that the period had been put at seven years because the medical advisers to the Ministry considered that any such complaint would show itself within seven years. Answering a further question on the same day, the Prime Minister said that the Government was not aware of any grounds to justify the appointment of a Select Committee to inquire into the whole question of war pensions and the machinery of administration of the Ministry of Pensions. It would not be a good thing if so complicated a matter as a Royal Warrant were to be subjected to special investigation at frequent intervals.

Medical Treatment.—Mr. Groves asked the Minister of Pensions, on March 25th, whether his attention had been called to the position of numerous disabled ex-service men who, on applying for treatment and being examined by the medical referee of the Ministry, were decided to be unfit in consequence of their pensionable disability, but were advised that their treatment should be from their ordinary panel practitioner instead of from the Ministry; whether he was aware that these ex-service men, although decided to be unfit for work, did not receive any treatment allowances, although they might be out of benefit so far as national health insurance was concerned, and that they were therefore compelled to apply for parish relief or charitable assistance; and whether, in virtue of the fact that the Royal Warrant expressly stated that men certified as being in need of treatment would be provided with it at the expense of the Ministry and receive the appropriate allowance, he would cause investigation to be held respecting the present procedure. The Minister replied that Mr. Groves was under some misapprehension as to the provisions of the Royal Warrant. Article 6 of that Warrant empowered the Minister to grant special allowances only in those cases where a disabled man was certified to need a specific course of treatment in consequence of which he would be rendered incapable of supporting himself and his family. The conditions governing the grant of allowances under Article 6 of the Warrant were not identical with those which determined certification for the purpose of sickness benefit under the National Health Insurance Acts, and it was not the function of the medical officers of the Ministry to determine generally whether a disabled man was fit for work or not. The Ministry's information was that the intentions of the Royal Warrant were being carried out.

Tuberculosis.—The Minister of Pensions informed Mr. Groves, on March 26th, that ex-service men suffering from pulmonary tuberculosis or diabetes mellitus could still receive under the Pensions Regulations, if the circumstances required it, additional allowances in the form of special diet, provided that the pension was not at the maximum rate.

Final Awards.—The gross number of final awards for officers and men declared up to the end of February is 478,098. Under Circular 30 the Ministry has dealt with 416 cases on the ground of serious errors of diagnosis or of prognosis. At present 247,800 final awards of life pensions and 264,200 conditional pensions are in issue from the Ministry of Pensions.

Medical Staff.—It is intended to recommend forty-eight of the existing whole-time medical staff of the Ministry of Pensions for permanent appointments, but no such appointments have yet been made. The successful candidates will enter on their new posts at their existing rates of pay, subject in a few cases to slight adjustments up or down.

Tuberculosis.

Segregation.—Colonel Day asked the Minister of Health, on March 26th, to consider appointing a court of inquiry to investigate and report on the prevailing conditions of the public health service of the country, and to inquire especially into the compulsory segregation of persons seriously affected with tuberculosis and in an infectious and incurable condition. Mr. Neville Chamberlain replied that as at present advised he saw no necessity for such an inquiry. Legislation on the compulsory segregation of persons suffering from tuberculosis and in an infectious condition had already been obtained by a number of local authorities, and possibly, as suggested by the Local Legislation Committee, an opportunity for dealing generally with the matter might be found on the Public Health Bill which the House had read a second time. Colonel Day further asked whether the Minister would take steps to provide protection to children and near relatives who, through lack of housing accommodation, were forced to live in close proximity to persons seriously affected with tuberculosis. Mr. Neville Chamberlain replied that it was for the local sanitary authorities to take all practicable steps to prevent the spread of infection.

Institutional Treatment.—Mr. W. C. Robinson asked what increased provision had been made for the treatment of tuberculosis in England since the issue of the circular of February 8th, 1924. Mr. Chamberlain replied that since then the provision of more than 1,300 additional beds had been approved. Local authorities had been authorized also to take additional beds at institutions belonging to voluntary bodies and to carry out other developments of their tuberculosis schemes. The number of persons under treatment for tuberculosis in residential institutions had increased by nearly 1,300 since February 1st, 1924. The net expenditure on tuberculosis by local authorities which was about to be sanctioned for 1925-6 was £100,000 in excess of the estimated net expenditure for 1924-5.

Finance: Insurance Reserve Fund.—Asked by Major Wheler and Mr. Bennett, on March 26th, why it was necessary to have so large a sum as £100,000,000 in reserve for England alone under the National Health Insurance Act, the Minister of Health said that liabilities under national health insurance increased with the age of the insured persons, while the contributions were fixed in all cases from 16 to 70, and were actuarially calculated to suffice for a person entering into insurance at 16. Whether funds had accumulated in excess of requirements was determined by the quinquennial valuations made under the Act. At the last valuation over £6,000,000 of surplus funds was distributed in additional benefits, and a considerably greater distribution was expected from the valuation now in progress. He thought that the reserve was still increasing, but the surplus from the last valuation would not be anything like £30,000,000.

Poison Gas Experiments.—Mr. Ammon asked the Prime Minister, on March 26th, if he would set up a public committee to inquire into the practice of subjecting young soldiers to the effects of poison gases for experimental purposes at the chemical warfare research department. The Financial Secretary to the War Office, Captain King, replied that there was no need for a public committee of inquiry. The conditions of the exposure of personnel to gas were carefully regulated in accordance with the best medical and scientific advice, and the experiments were made under the direction of medical officers. In answer to further questions, on March 31st, the Secretary for War said that 372 experiments with poison gas on human subjects had been made since 1918, and 188 soldiers were engaged in them. All volunteered for this special duty, and none suffered injury to the lungs or otherwise through being subjected to these tests. The experiments comprised exposures to low concentrations of gases to ascertain their physiological properties; exposure to gas of personnel protected by respirators; and tests on the human skin of new compounds to ascertain their irritant action, if any. All such experiments had been carried out under most stringent regulations, framed on the best medical advice obtainable to safeguard the health of those concerned.

Factories Bill.—Asked by Lord Henry Cavendish-Bentinck, on March 25th, whether the Government intended to pass the Factories Bill into law this session, the Home Secretary did not answer the question directly, but said that he must have further interviews and consultations before he could submit the proposed bill to the Cabinet, but he hoped shortly to be able to do so. (In a published statement the Home Secretary indicated that in the present depressed state of British trade he could not be responsible for

any legislation which would further reduce production and employment.) In an answer on March 26th, the Home Secretary said that one of the clauses of the Factories Bill was for bringing all workshops into the category of factories.

Declarations of Objection to Vaccination.—Mr. T. Thomson asked the Home Secretary, on March 26th, whether certain magistrates refused to witness statutory declarations under the Vaccination Act, 1907; and whether, following the precedent of one of his predecessors, he would address a circular to all magistrates, calling their attention to the legal obligations upon them to witness statutory declarations when sitting in open court, and pointing out to them that they are neither required nor authorized to cross-examine applicants as to the reason of their objection to vaccination. The Home Secretary replied that on March 17th he received a deputation from the National Anti-Vaccination League, which made representations on the subject. He would consider the question of issuing a circular when he had received and examined further particulars which he had asked the deputation to furnish.

Preservatives in Food.—In reply to a question, on March 25th, Sir Kingsley Wood, for the Minister of Health, said that the effect of the draft regulations of March 17th dealing with preservatives in foods was that all coal-tar colours which were not included in the schedule might be used in food till they were shown to be injurious to health. Although lead and arsenic were present in coal-tar products, the Minister was advised that the percentage of these substances liable to be introduced thereby into foodstuffs was so minute that it was unnecessary to extend the regulations by laying down the quantities of lead and arsenic permitted in such coal-tar compounds. He had arranged to receive a deputation from the confectionery, bakery, and allied trades with regard to the draft regulations. The scientific evidence on the effect of boric acid was thoroughly considered by the Departmental Committee on Preservatives in Food. Mr. Goodman Roberts, on March 30th, asked the Minister of Health whether he had any evidence that the small quantity of boron preservatives permitted to be used in liquid eggs was deleterious to health; whether it had been decided to prohibit this use of boron preservatives; and whether, before issuing regulations, he would consider the probable increased cost of important foodstuffs into which eggs enter, seeing that there was no adequate provision for cold storage in this country to make cold-storage eggs a practical substitute for liquid eggs. The Minister said that the Departmental Committee on Preservatives in Food was unanimously of opinion that boron preservatives were so harmful as to justify total prohibition. Before the final form of the regulations was settled full weight would be given to such considerations as Mr. Goodman Roberts mentioned.

Notes in Brief.

The Geneva International Labour Conference has decided against the inclusion of a draft convention on anthrax on its agenda, and the Home Secretary considers that nothing will be gained by a further attempt of the British Government to reopen the question.

Since the issue of the circular of February 8th, 1924, the number of maternity and child welfare centres in England and Wales has increased from 1,986 to 2,112. Proposals for about 30 additional centres are under consideration. Sessions for infant consultation, ante-natal work, and the like have been provided at 95 existing centres.

In 1924 £5,359,953 was paid as domiciliary poor relief to persons ordinarily engaged in some regular occupation and to their dependants. In the financial year 1924-5 the State paid £53,818,800 on health insurance, unemployment insurance, old age pensions, and unemployment grants. The charge for health insurance was £8,045,700.

From January 1st, 1924, to March 26th, 1925, 260 soldiers were discharged from the army for tuberculous disease.

The Prime Minister has announced that the Government has under careful consideration the statement of the Secretary for War that 5 out of every 8 recruits for the army are rejected as physically unfit.

The Royal Commission on Lunacy and Mental Disorder hopes to be able to present its report early next year.

Special provision is made, the President of the Board of Education announces, for the vocational training of students from special schools for defective children.

Deaths from malaria in India are included in the returns under the general heading of deaths from fever. In 1922 these were 3,600,000, of which a very large proportion were undoubtedly due to malaria. Recent reports showed that the desirability of attacking the breeding places of the mosquito was fully realized by the health authorities of the Provincial Governments, but the difficulties in the way of effective measures on a large scale were enormous.

The Minister of Agriculture informed Dr. Fremantle, on March 30th, that he has no power to arrange for the supply of the specific vaccine and serum for the prevention of pig erysipelas, which at present is only available from the Continent.

The Minister of Health does not consider it necessary to put on the Nursing Council the additional burden of issuing to registered nurses a detailed account of the moneys (approximating to £60,000) paid by them for the administration of the Act. An audited statement of accounts is issued annually.

In a question put on March 30th, Mr. Oliver suggested that 20 per cent. of the men employed in a certain factory were, in the week ending March 7th, affected with a complaint known as acetone gastritis. The Home Secretary states that the matter is being investigated.

Correspondence.

HEREDITY AND TUBERCULOSIS.

SIR,—In a leading article in your issue of March 14th (p. 517) you commented upon the opposing results obtained by Professor Raymond Pearl and Mr. G. J. Drolet in recent American researches into the hereditary factor in tuberculosis. If I may briefly recapitulate, the preliminary results of Professor Pearl's study of the family histories of tuberculous and non-tuberculous persons showed 8.9 per cent. of tuberculosis in the parental generation of the tuberculous, as compared with 1.8 per cent. in the parental generation of the non-tuberculous, figures which are at least consistent with the view that the hereditary factor is a real one. On the other hand, Mr. Drolet, in comparing the family histories of 2,605 tuberculous adults with those of 1,638 non-tuberculous adults, found rates of 12 and 13 per cent. respectively in the "preceding generation," which he defines in a footnote as "parents, grandparents, occasional aunt or uncle." I am quoting from Tables 2 and 3 on page 285 of his paper,[1] as this method of treatment, though open to criticism, brings out better the contrast with Professor Pearl's results. In the case of children the corresponding percentages were 42 for the tuberculous and 63 for the non-tuberculous.

In your article you urge that a fuller analysis of Mr. Drolet's material should be prepared before accepting his views regarding the hereditary factor, but as you do not suggest wherein the real fallacy lies, except that it may be in the accuracy of the family histories, I venture to do so, since the matter at issue is of considerable importance. It appears to me at once evident on reading Mr. Drolet's paper that the whole fallacy lies in the selection of his "non-tuberculous patients." As I understand the paper, these were all cases examined at the Bellevue Tuberculosis Dispensary, and found to be non-tuberculous; thus, in a footnote to Table 3, we are told that the material relating to these 2,509 patients was "compiled from the histories of all the non-tuberculous cases examined at the Tuberculosis Clinic of Bellevue Hospital, New York City, during the years 1913, 1914, and 1915." On page 281 Mr. Drolet says, "In the non-tuberculous part of the population examined in dispensaries, an ideal control group is available." My own view would be that for the purpose of studying the hereditary factor, no control group could possibly be more inadequate, for the obvious question arises—What are these non-tuberculous patients doing at a tuberculosis dispensary at all? Speaking from only a slight knowledge of tuberculosis dispensaries, I venture to suggest that the great bulk of the cases which appear on their books as non-tuberculous may be roughly placed into three groups:

1. Persons who have been expressly requested to attend the dispensary for examination by the medical officer or his staff of nurses because a parent, child, or sibling has been found to be tuberculous.

2. Persons who have come of their own choice, or, in the case of children, have been brought by their parents because they were nervous about their health, owing to a parent, child, or sibling being known to be tuberculous or to have died of the disease.

3. Persons sent by medical practitioners or coming on their own account for confirmation or otherwise of a suspicion of tuberculosis.

I should further judge, though I am prepared for contradiction by those who are better able to form an opinion, that for children under 16 these three groups would be roughly equal in size. If so, and the same conditions hold good in the American dispensaries, we should have to conclude that two-thirds of Mr. Drolet's "ideal control group" of non-tuberculous children had been in reality selected for the very reason that they had a near relative tuberculous! It is not surprising, therefore, that 63 per cent. of these children gave a history of tuberculosis in the preceding generation, and 12 per cent. more had a

[1] *American Review of Tuberculosis*, November, 1924, x, No. 3, pp. 280-298.

brother or sister affected. In the case of adults the first two groups would be relatively smaller and the effect of selection correspondingly less, but nevertheless sufficiently large, I believe, to account for most of the discrepancy between the 13 to 14 per cent. with parental tuberculosis and Professor Pearl's figure of 1.8 per cent.

Possibly I have overstated the case, but even so it must be evident that no quantitative conclusions whatever can be reached regarding the hereditary factor from a study of non-tuberculous patients on the books of a tuberculosis dispensary unless we are able to analyse exactly the reasons which brought them there. I may say that we have found the analysis of records of a tuberculosis dispensary in Great Britain, not as yet completed, to lead to very similar percentages to those found by Mr. Drolet, but the non-tuberculous patients have been regarded as useless for a control group in assessing the hereditary factor for the reasons I have given. Professor Pearl's control group was not, I think, open to these objections.—I am, etc.,

PERCY STOCKS.

Department of Applied Statistics, University College, London, W.C.1, March 26th.

*** The considerations adduced by Dr. Stocks emphasize the caution we gave; but whether even these suffice to account for the apparent excess of tuberculosis in the ascendants of the non-tuberculous, whether there is not some other peculiarity of the material, can only be determined after the fuller analysis which, in our view, should be published.

THE TREATMENT OF PNEUMOCOCCAL EMPYEMA.

SIR,—I think it is possible that a faulty impression of the value of the "suction method" for the treatment of empyema devised by Mr. F. Reynolds, and described by us in the *Lancet* (1921, ii, 1109), may be given by Mr. Hathaway in his letter in your issue of March 28th (p. 632). This I should like to correct, because I believe it to be a method which careful trial and study will prove to be of real value. At present it cannot be claimed that it has been thoroughly evolved, but in my experience fibrinous masses have not proved an obstacle, for they have in our cases gradually melted away. That the cannula may be blocked at times is certain, but this can be easily corrected, as stated in our paper.

There is one difficulty, only to be overcome by careful observation, and this is the interpretation of the physical signs in the chest when the drainage is in progress, upon which must largely turn the indication for withdrawing the cannula. These signs differ from those found in the open method, and I submit can only be gauged by making exact notes and also by noting the reasons for doubt when the removal of the cannula is in question. In finding one's way forward there must be at first hesitation, and in one case we resected later we found the cavity well drained and the operation unneeded. In another, in which I was in doubt, but resection was not done, the patient died from a pneumococcal meningitis, and here again the cavity was thoroughly drained. It is my belief that the problem of the removal of the cannula will prove to be no more difficult than it is in the open cases, when the physical signs have been thoroughly established. The difficulties in keeping the cannula from slipping out are those of technique, and I believe such are always surmounted, given the determination and the asset of skilled nursing.

The advantages are great: the avoidance of a considerable operation, the rapid recovery, the absence of nerve-racking dressings for the child are sufficient in themselves. Some cases will be unsuitable, but many more are suitable for this method. At present hospital supervision is probably needful, and there is a very rightful suspicion of dealing with pus in the chest, except by opening the cavity and drainage, founded upon the fear of leaving a hidden pocket; but my experience leads me to believe that the method is one of real value and deserving of careful trial and that failure is not dependent upon the occurrence of thick lymph.—I am, etc.,

F. JOHN POYNTON, M.D., F.R.C.P.Lond.

London, W.1, March 29th.

THE IMMEDIATE AND REMOTE EFFECTS OF SUNLIGHT ON THE EPIDERMIS.

SIR,—In reference to Sir Lenthal Cheatle's interesting letter in the JOURNAL of March 28th (p. 631), may I point out that O. Bernhard of St. Moritz, in his excellent book *Sonnenlichtbehandlungen in der Chirurgie*, says that he has never seen a case of epithelioma of the face, or hands, in the guides, drivers, postilions, and postmen, who are constantly exposed in the Alpine passes to intense sun radiation with reflection from ice and snow. The ultra-violet rays are very strong in the Alpine heights; our method of measurement by bleaching of acetone methylene blue gave a reading at Leysin of 41 on one sunny day, against 23, the highest reading obtained at Peppard Common Sanatorium by Dr. Paul Tozer last summer; 5 is his highest reading so far for a sunny day this month.

Bernhard ascribes gardener's epithelioma to dirt and chemical irritation, which, he says, causes eczema. So, too, with seaman's cancer, which, I believe, has become rare since the giving up of sailing ships and of the use of tar. If there were danger of ultra-violet radiation causing cancer, as *x* rays have done, the operators and patients in such institutes as the Finsen would have shown this by now.—I am, etc.,

London, N.W.3, March 30th. LEONARD HILL.

THE THYROID AND MANGANESE TREATMENT IN VARIOUS DISEASES.

SIR,—I had the privilege of being acquainted with Dr. Nott's methods, and of making trial thereof, before publication of his able article in your issue of March 7th (p. 443). The great interest of his practice is indicated in your leader of the same date, and in your note of March 14th (p. 520) upon the prescription of manganese.

Exactly how this drug acts would appear to be still matter for speculation altogether too deep for the ordinary clinician, who will probably accept, in seeking an explanation of the end-results, the simple summing up of one practical authority who wrote in answer to my appeal for guidance on the point: "All we know about manganese is that it appears to have the property of 'activating' other elements such as iron. Why such a comparatively small quantity of manganese has so vigorous an action we are unable to find out."

Regarding manganese just as an "activator" makes it easier to form from analogy some idea of the enhanced anti-toxic action in the blood of certain endocrine secretions and inorganic bases which results from its presence, for it would seem that the combined treatment advocated by Nott is capable of giving effects which either thyroid or para-thyroid, with or without calcium, do not.

The cases which have interested me most are those in which a toxaemia is presumed to have occurred through the intestinal tract, especially those of rheumatoid arthritis in which the usual patent sites of infective foci were drawn blank. The discharge of casts and shreds in some of them, followed by advance in general well-being and improvement in affected joints, even when such joints looked almost hopeless from clinical and *x*-ray examination, is most striking.

I find it difficult to accept the explanation suggested in your prescription note that these casts are caused by the action of caustic alkali formed during the decomposition of the permanganate. Their discharge does not go on repeatedly with the injections; it seems to take place after a few days of the treatment, and is not continuous. The impression given is rather that some drastic clearing up of a catarrhal mucous membrane has occurred, and if we assume that manganese, like excess of iron, is excreted through the intestinal mucous membrane, then may it not be that the manganese during the process of excretion "activates" the catarrhal cells to such effect that they recover from this condition and become once more capable of acting as an efficient barrier against the passage of both organized and unorganized toxins from the bowel? It would be of interest to have expert evidence of how manganese exactly is excreted from the system.

This line of argument suggests another point to all interested in spa treatment. Various theories have been

advanced to account for the superior action of natural medicinal waters over imitations containing their chief ingredients compounded in the laboratory—radio-activity, for instance. Since the effective dose of manganese is apparently very small, it may be that the presence of this element in such waters is of more importance than has hitherto been thought, especially if shown to be in greater amount than in ordinary water supplies. All the Cheltenham springs (the Fieldholme, Pitville, Lansdown, and the Chadnor) contain manganous sulphate or carbonate.—I am, etc.,

J. S. KELLETT SMITH, F.R.C.S., D.M.R.E.

Cheltenham, March 16th.

TREATMENT OF DIABETES BY RAW FRESH GLAND (PANCREAS).

SIR,—Dr. Hollins's paper in the BRITISH MEDICAL JOURNAL of March 14th (p. 503) led me to try feeding the raw pancreas to a diabetic under my care in the Rutland County Hospital.

The patient, a youth aged 21, is a member of a "diabetic family," in which numerous deaths from diabetes have been traced, including a brother and sister. The patient could only deal with 1½ oz. of starchy food; anything more was followed by sugar in the urine. On March 14th I ordered raw pancreas and gradually modified the diet, until now he is on full ordinary diet (bread, potatoes, milk puddings), and there is not a trace of sugar in the urine. The matron told me that a gland (cost 8d.) was enough for four days' treatment. The patient is now at home and his mother has no difficulty in preparing the gland.

To my mind Dr. Hollins's discovery is of even greater practical importance than that of insulin, as it brings the treatment within the range of the mass of people, whereas insulin was only for the few.—I am, etc.,

WILLIAM DUNN.

Uppingham, March 24th.

LIME JUICE AND LEMON JUICE FOR PREVENTION OF SCURVY.

SIR,—Rear-Admiral Sir P. W. Bassett-Smith (JOURNAL, February 21st, p. 385) has evolved a method whereby an efficient and easily portable antiscorbutic capable of keeping its properties over a number of years can be prepared. From my own point of view his work is chiefly of interest from its value to polar exploration, but it has a much wider application.

Scurvy as a fully developed disease is rare in this country. Numerous cases occurred during the war amongst populations whose food had to be found by the British. A large number were seen during the campaign in North Russia. Some occurred amongst our own troops, but in the early stages—that is, what might be called the prescorbutic stage. They were not always recognized owing to the vagueness of symptoms and absence of well marked signs. The symptoms consisted chiefly of tiredness and lethargy, for which the victim was at a loss to account. The condition, as those who have suffered from it know, is a very real one, those affected being quite incapable of sustained effort, either mental or physical, and for all practical purposes are rendered *hors de combat*. McCarrison and others have shown that in this prescorbutic stage there are marked changes in the gastro-intestinal tract and in the endocrine glands. The cases I saw, both the early and fully developed conditions, cleared up readily when active antiscorbutic vitamin was added to the ration. The lemon juice as supplied to the troops proved quite effective, but was by no means easily portable, readily froze, causing the jars in which it was contained to break, and was so intensely bitter that the men could scarcely be induced to take it. It is probable that in other places and on other occasions numerous cases of scurvy in the prescorbutic stage occurred which were not recognized, but would have been prevented by routine use of an efficient antiscorbutic. The value of a portable and palatable preparation such as that in question cannot be doubted for use in military campaigns, where relief is required for destitute populations, for cruises such as that of the *Discovery* about to be carried out under the auspices of the Colonial Office, and for polar expeditions. The trouble at present is to obtain the concentrated preparation, since the demand is small and firms will not put down an expensive plant where only limited quantities of the product are required; consequently the adoption of such a preparation by the Admiralty or the War Office would benefit, not only members of the services, but many outside.—I am, etc.,

A. H. MACKLIN.

Swindon, Feb. 22nd.

ROYAL ABERDEEN HOSPITAL FOR SICK CHILDREN.

SIR,—The directors of this hospital have decided to proceed at an early date with the erection of a new hospital. An excellent site has been obtained at Forresterhill, forming part of the ground on which it is hoped to concentrate the hospitals of the city according to the "joint hospital scheme" at present under consideration. Plans have been finally approved for a new children's hospital of 132 beds, with out-patient and other special departments.

While every consideration has been given to economy, it has been found that in order to get a really good and well equipped hospital in which the treatment of the diseases of children can be carried out according to modern standards of efficiency, it will be necessary, at the present high cost of building, to face an expenditure of not less than £110,000. Funds already collected and promised amount approximately to £65,000, and the directors are now issuing an appeal for the remaining £45,000. At a meeting of the honorary staff of the hospital it was resolved that a special appeal be made to all members of the staff, to old residents, and to any graduates of the University of Aberdeen who may care to contribute. We confidently hope that we may be able to collect a sum sufficient for the construction or for the equipment of some special part of the hospital.

The deplorable condition of the present hospital is so well known to graduates, and particularly to old residents, that it is not necessary to enlarge on it here; but it may be emphasized that the age and general unsuitability of the present building hamper, not only the efficient treatment of patients, but the adequate instruction of medical students and nurses. The provision of a new hospital will therefore benefit, not only the community, but also the Medical School in Aberdeen.

I have been asked by my colleagues on the staff to make this appeal through your columns, and we hope that it will meet with a ready response from those to whom it is addressed.

Contributions, marked "Staff Fund," may be sent to Miss Hill, Lady Superintendent of the Hospital, who has kindly promised to acknowledge their receipt.—I am, etc.,

ALEX. MITCHELL,
Surgeon, Royal Aberdeen Hospital for Sick Children.

March 27th.

NEED FOR A POST-GRADUATE SCHOOL IN LONDON.

SIR,—Dr. F. Melville Harvey in the JOURNAL of March 28th (p. 637) has struck the right note.

My difficulty has been his—that I cannot be absent day after day. But I, like Dr. Harvey, and no doubt hosts of other men, could arrange one "hospital afternoon" a week practically all the year round, and would gladly pay for a "season ticket"; and, given teachers who can teach, I should consider those four or five hours the best in the week.

But this leads to one other point: Dr. H. B. Newham is reported to have criticized the existing schemes on two grounds. One, that some teachers could not teach; the other, that "curiosities" formed too large a part of the demonstrations. If I may venture to offer suggestions, they would be that on two afternoons in every week there should be four-hour courses—for example, on Tuesday from 3 to 7 p.m. a course at the Brompton Chest Hospital, on Friday at a throat and ear hospital; and each such course

should begin at the very rudiments, and advance through a term of six weeks or so to the requirements of the specialty.

How valuable, for instance, to many of us would be an attendance on four or six consecutive Fridays at a course of instruction on the heart; still more on the lungs.—I am, etc.,

March 30th. A. O. W.

SIR,—I feel sure many will agree with Dr. Melville Harvey's letter on the need for special post-graduate facilities for London practitioners. It is to be hoped that his proposals will be considered by the Fellowship of Medicine.—I am, etc.,

London, N.W.1, March 30th. RUSSELL STEELE.

SIR,—It may interest Dr. Melville Harvey to know that there is a post-graduate association in London which might be able to give him what he wants. Any general practitioner in active practice and permanently settled in the London area may become an annual member of the West London Hospital Post-Graduate College at a fee of three guineas a year, and for this he may attend the hospital practice once a week. A syllabus of the work done each day can be obtained on application to the secretary at the College, but as a typical example may I be permitted to set out the Monday afternoon time table.

In-Patient Work.—2 o'clock, surgeon No. 1, operations; 2, surgeon No. 2, surgical ward visit; 3, senior physician—medical ward visit.

Out-Patient Work.—2 o'clock, medical out-patients; 2, surgical out-patients; 2, diseases of the eye; 2, diseases of women.

On the second Monday of each month, at 4 p.m., a staff consultation is held, when cases of special interest are demonstrated and discussed by members of the hospital staff.—I am, etc.,

March 30th. HENRY SIMSON, Dean, West London Hospital.

ISOLATION HOSPITALS AND SCARLET FEVER.

SIR,—I have no wish to enter into any discussion with Dr. J. A. Milne on his father's method for attempting to prevent the spread of scarlet fever without isolation. My reference was to the Barnardo Homes, Ilford, in which institution the photographs displayed by his father, illustrating the treatment, were taken. At this particular institution the treatment was found to be so inefficacious in the control of scarlet fever that the usual system of isolation is now enforced. Is it not a fact that isolation is now insisted on even at the Barnardo Home, Woodford Bridge, an institution actually under Dr. J. A. Milne's charge? Whether he still employs carbolized oil for its "analgesic" properties is beside the mark. The method was initiated to prevent the spread of infection and avoid the necessity for isolation, and it was on this question that the discussion in the BRITISH MEDICAL JOURNAL arose.

There is no need for Dr. J. A. Milne to refer me to the reports of other medical officers of health, with which I am quite familiar. A number of cases are nursed annually in Ilford in their homes (where conditions are suitable), *without* the Milne treatment, and as a rule there are no return cases. It is altogether a different question whether cases of scarlet fever should be nursed in workmen's dwellings in overcrowded and unhygienic conditions, reliance being placed on the Milne method to prevent the spread of infection.

In the Barnardo Homes, Ilford, taking one year only, the return case rate was 28 per cent. with the Milne treatment; in the same year the return case rate for the Ilford Isolation Hospital without the Milne treatment was 3 per cent. When, however, a full period of isolation was insisted upon at the Barnardo institution the return case rate for both institutions became the same.

These are the facts which Dr. J. A. Milne cannot gainsay. While we all respect his reverence for his father's method I confess I am unable to understand how any medical man could think (in view of our knowledge of the difficulty of dealing with carriers generally) that the Milne treatment could render the scarlet fever organisms in the naso-pharynx innocuous.

The unchallenged published results, extending over a period of eighteen years, have added the final proof.—I am, etc.,

Ilford, Essex, March 22nd. A. H. G. BURTON, Medical Officer of Health.

THE TREATMENT OF INFANTILE PARALYSIS.

SIR,—Dr. Charles MacKay (JOURNAL, March 28th, p. 634) would give the credit for the muscle re-education treatment to Dr. William MacKenzie in 1915, but I suggest he should go fifty years back and give it to my grandfather, Dr. M. Roth, who, in his book on paralysis in infancy, etc., published in 1869, wrote: "As soon as possible rouse the action of the paralysed muscles by the most important functional stimulus of the will, which cannot be replaced by any other."

In Professor Hey Groves's account of the treatment I was amazed to observe the absence of any mention of the importance of keeping the affected limb warm. I thought it was now generally agreed that the prevention of deformity, the maintenance of warmth, and the re-education of muscles, constituted a trinity, no member of which was efficient without the other two. Did he omit this on purpose?—I am, etc.,

London, W.1, March 28th. PAUL BERNARD ROTH.

RADIUM EMANATION (RADON).

SIR,—It has recently been prominently stated in the lay press that the production and clinical use of radon (radium emanation) by the Middlesex Hospital is a "new discovery." In justice to the Radium Institute will you allow me to say that the technique of treatment by radon tubes has been practised here since 1912, and that the method adopted was published in the annual report of this institute for that year? Since that date radon tubes have been supplied in steadily increasing number to medical practitioners and hospitals throughout the country, and 1,067 such tubes were distributed in the year ending December 31st, 1924.—I am, etc.,

The Radium Institute, London, W.1, March 30th. A. E. HAYWARD PINCH, Medical Superintendent.

Medico-Legal.

AN ALLEGATION OF NEGLIGENCE AT A CONFINEMENT.

GRAY AND WIFE *v.* PEACOCK.

AN action was heard in the King's Bench Division, on March 25th, 26th, and 27th, before the Lord Chief Justice and a special jury, in which William Gray and his wife Alfreda claimed damages against William Ernest Peacock, M.D., a general practitioner of Great Portland Street, London, W., for alleged negligence in treating Mrs. Gray during her confinement. In his reply, Dr. Peacock denied any negligence, and said that if Mrs. Gray sustained any injury it was unavoidable, and that what he did was done in accordance with correct medical practice. The defendant counterclaimed for £42 16s., the amount of his fees. Mr. Barrington-Ward, K.C., with Mr. P. E. Sandlands, appeared for the plaintiffs, and Mr. H. C. Dickens for the defendant.

In opening the case, Mr. Barrington-Ward said that the plaintiffs, now both aged 23, were married in June, 1922. In the following November Mrs. Gray, who had become pregnant, consulted Dr. Peacock, and he undertook to treat her during her confinement for a fee of fifteen guineas. Between January and March, 1923, there were various consultations. It was alleged that at the confinement, on March 26th, the defendant applied forceps in the first stage of labour, and without the plaintiffs' consent. During delivery, shortly before 10 p.m., the perineum was ruptured. Dr. Peacock sent the husband for gut and needles and repaired the tear, but left without removing the placenta, saying that it might come away during the night. At 7 next morning the nurse, who had tried to remove the placenta, telephoned for Dr. Peacock; he arrived an hour later with Mr. R. M. Rowe, and the latter removed the placenta under chloroform. On March 31st the stitches gave way. On May 11th Mrs. Gray consulted Dr. Burnet, who advised her to discharge Dr. Peacock from further

attendance, and six days later she was operated on in a nursing home by Dr. F. J. McCann and Dr. Burnet. Counsel argued that the defendant's negligence had cost the plaintiffs £220 in fees for the nursing home, nurses, and holidays. The defendant, he said, had not brought to his task that competence and care which the law required of everyone engaged in a skilled profession.

Both the plaintiffs gave evidence in support of counsel's opening speech, and were cross-examined by Mr. Dickens.

Dr. Edward Burnet said that he had had a large obstetrical experience, and expressed the opinion that it would be wrong to use forceps in the first stage of labour. The placenta should never be left unremoved for more than an hour. With a perineum torn as in this case a thorough reparative operation ought to be performed at once after the third stage of labour was concluded. When he first examined Mrs. Gray forty-six days after the birth her condition seemed to him such that she should be attended to without further delay, and he advised her to see a gynaecologist. He came to the conclusion that there was no justification for the damage that had been done or for the delay in repairing it. In cross-examination he said it was about ten years since he last attended a confinement. He did not agree with the school of thought which held that if a first suture failed an interval of three months should pass before resuturing.

Dr. F. J. McCann, who performed the operation on May 17th, 1923, said that in his view the sooner ruptures of the perineum, such as Mrs. Gray had sustained, were repaired the better. He inclined to the opinion that the operation could properly have been performed before May 11th, when he first examined the patient. It was right to postpone an operation in cases of infection, but when he operated in this case there was no trace of infection. The condition of this patient might, however, quite possibly have been such that it would not have been prudent to perform the operation earlier than it was performed. Assuming that the labour pains began at 8 a.m., and became severe at 8 p.m., it seemed to him extraordinary that forceps should be applied at 9 p.m.; they ought never to be used in the first stage of labour. In reply to the Lord Chief Justice, Dr. McCann expressed the view that the patient's condition was undoubtedly produced by the forceps, but he would not be prepared to say that because forceps had been used such use was improper. Dr. W. E. Falconar also gave evidence for the plaintiffs.

Mr. Dickens, addressing the jury, described it as a monstrous thing to blame Dr. Peacock, who was on the spot and was the best person to judge what should be done. The only charge of negligence against him was that he brought about delivery with undue speed; but that was merely a matter of conjecture, which the medical witnesses for the defence would dispel. The child was born alive and healthy, and who was to say that the defendant was wrong in what he did?

Mr. Aleck W. Bourne, F.R.C.S., said that the injury in this case was one of the commonest happenings in confinements, especially a first confinement. In his view Dr. Peacock acted with fine judgement and skill, and was in no respect negligent. If the mother showed signs of exhaustion or the child showed that it was feeling the stress of labour unduly, it would be quite proper to apply forceps whatever the time.

Mr. Leonard Phillips, F.R.C.S., entirely agreed with what Mr. Bourne had said as to the use of forceps and with his evidence generally. He thought Dr. McCann had been lucky in obtaining a cure after operating so early as May 17th.

Mr. Victor Bonney, F.R.C.S., said he had known defendant for twenty years, and from what he had heard of this case considered Dr. Peacock was justified in the judgement he came to regarding the conduct of Mrs. Gray's confinement. Forceps delivery one hour after the beginning of the second stage of labour was not improper. Rupture of the perineum was not evidence of precipitancy on the part of the attendant; forceps properly applied might minimize the tear. In general, if the first sutures broke down his own practice was to wait six months before attempting operative repair; the reason for this was the risk of septic infection.

Dr. Peacock, giving evidence on his own behalf, said he had been in general practice for thirty years; he had a large midwifery practice, and had never lost a child nor had a case of sepsis. He still considered that he was right in what he did in connexion with Mrs. Gray's confinement. Her exhausted condition, through inability to take food, necessitated the use of forceps. The patient's exhaustion and the risk of sepsis led him to leave the placenta unremoved until the next morning. The first sutures, as often happened, broke down, and he postponed resuturing until such time as he should consider the patient's condition justified it.

Eleanor Ferry, the nurse in attendance at the confinement, described the birth as difficult, and said that before forceps were applied the patient appeared to be suffering from uterine inertia. She heard no complaint about the defendant's treatment of Mrs. Gray while she was attending the case.

Mr. R. M. Rowe, F.R.C.S., who accompanied the defendant to the case on the day after the confinement, said that in his view events justified Dr. Peacock's treatment.

In the course of his summing up, the Lord Chief Justice said that a doctor did not guarantee results; but in holding himself out to practise medicine and surgery he undertook to have a reasonable and competent measure of skill, and to use reasonable care. The jury had to decide whether they were satisfied that defendant used forceps in circumstances in which he should not have done so, and if the injury Mrs. Gray afterwards showed was due to the use of forceps.

The jury returned a verdict for the defendant, and judgement was entered accordingly for Dr. Peacock on the claim and on the counterclaim for £42 16s., with costs.

Universities and Colleges.

UNIVERSITY OF OXFORD.

Radcliffe Prize and Travelling Fellowship.

ON the report of the examiners the Radcliffe Prize has been awarded by the Master and Fellows of University College to John M. H. Campbell, D.M. (Magdalen and New College). The work of Kenneth J. Franklin, M.A., B.M., Fellow of Oriel College, was highly commended. The prize is of the value of £50, and is awarded every two years for research work in medicine by a medical graduate of the University.

The Radcliffe Travelling Fellowship, 1925, has been awarded to Kenneth J. Franklin. The Fellowship is of the annual value of £300, and is tenable for two years, subject to certain conditions of travel and study abroad.

UNIVERSITY OF DURHAM.

AT the convocation held on March 28th the following degrees were conferred:

M.B., B.S.—J. F. Hedley, Gwendolen Jones, M. H. Jones, W. F. Lascelles, H. Levy, F. Lishman, Charlotte B. Schofield, A. B. W. Smart.

VICTORIA UNIVERSITY OF MANCHESTER.

DR. FREDERICK CRAVEN MOORE, at present lecturer in systematic medicine, has been appointed to the chair of systematic medicine.

UNIVERSITY OF EDINBURGH.

THE Senatus Academicus of the University of Edinburgh proposes to confer at the graduation ceremonial in July the honorary degree of Doctor of Laws upon Dr. A. H. Freeland Barbour, formerly Lecturer in Gynaecology, University of Edinburgh, Mr. Alexander Miles, M.D., F.R.C.S.E., formerly Lecturer in Clinical Surgery, University of Edinburgh, Dr. Robert Muir, F.R.S., Professor of Pathology, University of Glasgow, and Sir Harold J. Stiles, K.B.E., Regius Professor-Emeritus of Clinical Surgery, University of Edinburgh. On the occasion of the meeting in June of the Interstate Post-Graduate Assembly the honorary degree of LL.D. will be conferred upon Dr. Charles H. Mayo, of Rochester, Minnesota.

At a graduation ceremony, held on March 26th, the following degree and diploma were conferred:

D.Sc. (*Department of Pure Science*).—Eric Ponder, M.B., Ch.B.
D.P.H.—W. N. J. Chapman.

UNIVERSITY OF ABERDEEN.

THE following candidates have been approved at the examinations indicated:

M.D.—M. M. Cruickshank, A. Mitchell, R. R. Traill, J. Maclennan.

FINAL M.B., CH.B.—*P. Bayer, H. C. Bonney, W. Booth, L. Chanock, *A. Cruickshank, R. A. Cumming, J. M. Davidson, G. M. Davis, C. A. Dean, Jessie R. G. Dingwall, *C. S. D. Don, A. T. Duncan, G. N. Duthie, Margaret M. Gair, A. Galloway, J. A. Gordon, J. D. Gordon, T. R. Gordon, Janet Johnston, W. Keily, D. B. Laing, J. Macarthur, *P. D. A. Macdonald, K. C. Mackenzie, D. N. Mackinnon, F. S. M'Lean, Anne G. L. Maclennan, *W. A. Marr, G. W. Mearns, L. Morgan, J. A. Mulligan, N. M. Munro, *J. A. R. Paterson, O. G. Prosser, W. J. Raitt, W. P. E. Richards, J. Robertson, *M. C. G. Robertson, A. A. Simpson, *J. T. Sorley, W. R. Soutter, Barbara W. Spark, D. S. Stewart, J. I. Taylor, H. M. Walker, J. D. Walker, *R. W. H. Welsh, A. D. F. White, A. H. Wilson, Charlotte M. Wilson, D. E. Wilson.

* Passed with distinction.

UNIVERSITY OF DUBLIN.

SCHOOL OF PHYSIC, TRINITY COLLEGE.

THE following candidates have been approved at the examinations indicated:

FINAL M.B., PART I.—*Materia Medica and Therapeutics, Medical Jurisprudence and Hygiene, Pathology and Bacteriology:* *R. A. Q. O'Meara, *J. W. Bowden, *J. M. Selkon, *R. E. Hadden, *T. J. W. Keown, *J. H. M'Lean, J. J. O'Dwyer, G. W. H. Townsend, A. B. Brooks, J. N. S. Gouws, M. Hoffman, C. G. Nel, Kathleen I. Purdy, D. St.C. Mackenzie, G. O. Taylor, E. A. Ellis, Gladys L. Craig, D. J. Roux, J. Johnston, Christina M'Donald, Rachael E. Porter, J. Quigley.

PART II.—*Medicine:* *T. W. MacDowell, C. F. D. M'Caldin, W. C. Somerville-Large, Kathleen D. Murison, G. F. Gillespie, E. M'Alpine, W. H. Anderson O'D. T. D. Browne, J. R. Gregory, R. T. Cronin, J. Dick, T. C. Foster, P. N. H. Labuschagne, W. B. Roantree, F. M. Purcell, N. M. Greeves, F. J. Marais, Annie T. Deane, F. H. M'Kenna, J. V. Morris, R. W. Harte, J. Cussen, G. P. Bamford, O. Chance, W. P. E. M'Intyre, Augusta M. Young, W. Gallagher, J. L. Levingston, J. L. Marshall, Mary Galvin, F. V. Duke, C. Lord-Flood, J. A. MacDonnell, R. A. Heatley, J. Horwich, H. Nelson, A. A. Shafik. *Surgery:* *E. M'Alpine, R. K. Carson, W. A. Redmond, R. T. Cronin, J. A. MacDonnell, L. C. Brough, E. T. S. Rudd, E. S. A. Crawford, T. G. B. Crawford, F. M. Purcell, H. W. Strong, J. M. Johnston, C. J. du Plessis, E. J. Walsh, J. E. Beatty, J. Crawford, F. J. Marais, L. M. Whitsitt, E. A. Bennet, R. J. G. Hyde, J. G. Maguire, G. W. Garde, W. C. G. Potts, C. R. Moore, H. Birney, R. V. Franklin, R. A. Heatley, I. Strasburg. *Midwifery:* *C. R. Boland, *J. F. Wilde, *R. L. Forsyth, *E. Rakoff, Elspeth V. D. Hewat, F. H. M'Kenna, J. E. Stokes, G. D. Edwards, A. A. Shafik, M. Sherowitz, P. B. Robinson, B. P. Pienaar, Margaret W. Pike, L. W. R. Haskins, C. E. M'Causland, W. Sinclair, Mary Galvin, Henrietta Armstrong, J. E. Beatty, W. C. Sloan.

M.CH.—D. de Bruijn.

M.A.O.—D. J. Malan.

DIPLOMA IN GYNAECOLOGY AND OBSTETRICS.—Elizabeth N. Thompson.

* Passed on high marks.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.

DIVISION OF TROPICAL MEDICINE AND HYGIENE.

THE following medical officers passed the school examination at the termination of the seventy-seventh session (January–March, 1925):

*A. C. Craighead (Duncan medal), *A. N. Haworth, *R. Klaber, *N. E. Goldsworthy, *A. S. Mohamed, K. Lumsden, W. J. Vickers, P. C. C. Garnham, A. H. Campbell, E. N. Cook, J. N. Banks, J. W. Graham, A. B. Monks, E. M. Fraser, E. B. Struthers, P. F. A. Grant, H. H. Brown, J. H. Bowyer, M. Ali, J. Gordon, J. Manley, R. C. Spiers, T. S. Goodwin, F. C. Read, M. Lal, H. J. More, J. Enzer, O. G. Wilde, R. W. C. Thambiah, A. N. Coomarasamy, G. M. Moffatt, A. H. Maclean, J. L. Stuart, R. H. Mumford, T. C. Pan, V. F. T. Chan.

* With distinction.

The Services.

FOREIGN DECORATIONS.

THE following are among the decorations and medals awarded by the Allied Powers to British forces for distinguished service rendered during the war 1914–19.

BY THE PRESIDENT OF THE FRENCH REPUBLIC.

Médaille de la Reconnaissance Française.—En Argent: Captain W. K. Campbell, D.S.O., M.B.E., M.C., R.A.M.C.; En Bronze, Major Wilfred Vickers, D.S.O., Army Medical Corps, Australian Imperial Force.

BY THE KING OF THE SERBS, CROATS, AND SLOVENES.

Gold Medal for Distinguished Service.—Captain W. L. Murphy, R.A.M.C.(T.F.).

Silver Medal for Distinguished Service.—Captains G. S. Davidson and E. D. D. Dickson, R.A.M.C. (S.R.).

DEATHS IN THE SERVICES.

Lieutenant-Colonel David Wilson Scotland, Bengal Medical Service (ret.), died at Colinton, Midlothian, on February 19th. He was born at Saharanpur on November 16th, 1861, and was educated at Edinburgh, where he graduated M.B. and C.M. in 1886, and M.D. in 1899. He entered the I.M.S. as surgeon in 1886, became lieutenant-colonel after twenty years' service, and retired in 1907. Most of his service was spent in civil employ in the North-West Provinces, now the United Provinces of Agra and Oudh. He received the order of the Kaisar-i-Hind, second class, 1900.

Lieut.-Colonel John Gover Williamson, R.A.M.C.(ret.), died at Hastings on January 18th, aged 76. He was educated at St. Bartholomew's Hospital, and took the diplomas of M.R.C.S. and L.S.A. in 1869, and of L.R.C.P.Lond. in 1870. He entered the R.A.M.C. as assistant surgeon in 1871, and during his early years he served in the 65th Foot, now the 1st battalion of the York and Lancaster regiment. He attained the rank of brigade surgeon lieutenant-colonel in 1895, and retired in 1896. After retirement he was employed at Bull Point from 1896 to 1905, and at Leicester from 1905 to 1913. He served in the Afghan war of 1878-80, receiving the medal.

Lieut.-Colonel John Robert Stuart, R.A.M.C.(ret.), who died at Alassio, Italy, on February 27th, was born at Inverness on March 18th, 1855, the son of the late Colonel J. R. Stuart, Royal Scots Fusiliers. He entered the army as surgeon on February 3rd, 1883, became lieutenant-colonel after twenty years' service, and retired in 1910. He served in the Nile campaign of 1898, when he was present at the battle of Omdurman, and received the medal with a clasp and the Egyptian medal.

Obituary.

DR. JAMES TAYLOR of Clifton, Bristol, who died on March 22nd, aged 71 years, was the elder of two sons of the late Dr. James Taylor, who practised at Bristol. He was educated at Bristol and Edinburgh, and took the diplomas of L.S.A. in 1875 and M.R.C.S.Eng. in 1876. He was one of the early workers in radiology, being the first skiagraphist appointed to the Bristol Royal Infirmary; on his retirement from that post he was appointed consulting radiologist to the infirmary. He held a commission as captain R.A.M.C.(T.), and was attached to the 2nd Southern General Hospital. Dr. Taylor was an enthusiastic musician, and often assisted the Medical Dramatic Club and the old Clifton Amateur Operatic Society in their performances. He was a member of the Bristol Division of the British Medical Association and of the Bristol Medico-Chirurgical Society.

Dr. NOGUERUS, professor of children's diseases in the University of Valladolid, has recently died of leukaemia, at the age of 40.

Professor F. VILLAR, a well known surgeon of Bordeaux, has recently died.

Medical News.

OWING to the Easter holidays it will be necessary for the next issue of the BRITISH MEDICAL JOURNAL to go to press a day earlier than usual. All communications and advertisements intended for insertion in the issue dated April 11th must therefore be received not later than Monday, April 6th. The offices of the British Medical Association and JOURNAL will be closed from Thursday evening, April 9th, till Tuesday morning, April 14th. We regret that, owing to a dispute between the Federation of Master Printers and the National Union of Printing, Bookbinding, Machine Ruling, and Paper Workers, there was some delay in issuing and dispatching the JOURNAL for last week, but no time was lost so soon as the dispute was settled.

THE Fellowship of Medicine announces that Sir Arbuthnot Lane will preside at the resumed discussion on post-graduate study in London at the house of the Royal Society of Medicine on April 8th, at 6 p.m. It is hoped that many members of the medical profession will attend and express their views. During the fortnight commencing April 20th there will be an intensive course in medicine, surgery, and the specialties at the Hampstead General Hospital, a course in diseases of children at the Queen's Hospital, Hackney Road, E.2, and a course in proctology at St. Mark's Hospital. Copies of the syllabus of these courses may be obtained from the Secretary to the Fellowship of Medicine, No. 1, Wimpole Street, W.1.

UNDER the auspices of the Strasbourg Faculty of Medicine an intensive post-graduate course in tuberculosis has been organized by Dr. Vaucher, general secretary of the Anti-tuberculosis Association of Alsace-Lorraine. It will be held in Strasbourg from October 9th to 24th, and will include lectures by a number of teachers in the faculty on various aspects of medical and surgical tuberculosis; instruction will be given also in bacteriology, radiology, and the operation of artificial pneumothorax. The fee for the course is 200 francs; further information may be obtained from Dr. Vaucher, 22, rue de l'Université, Strasbourg.

THE Physiological Society is meeting this week-end in Holland. The main business will be conducted in the Pharmaco-therapeutical Institute and physiological laboratory at Leyden. A visit will also be paid to the physiological laboratories at Utrecht.

THE course in parasitology to be held in the Tropical Division of the London School of Hygiene and Tropical Medicine from April to June will commence on April 27th, and not as previously printed. Inquiries should be addressed to the Director of the School, c/o Institute of Historical Research, Malet Street, W.C.1.

THE Royal Microscopical Society will hold a conference in the University of Sheffield on April 20th, 21st, and 22nd. The first paper will be read by Mr. J. E. Barnard, F.R.S., of the National Institute of Medical Research, who will deal with modern microscopical methods. Papers having a pathological bearing will be read by Dr. W. E. Cooke on pernicious anaemia, by Sir Kenneth Goadby on lung fibrosis in iron mining, and demonstrations of the Golgi apparatus will be given by Dr. C. Da Fano, Mr. A. Subba Rau, and Dr. F. W. R. Brambell. A paper on the cytology of cancer will be read by Dr. R. J. Ludford. There will be a trade exhibition of scientific instruments and apparatus, and visits will be paid to several of the chief steel works in Sheffield.

THE Dutch Congress of Natural Science and Medicine will be held at Gröningen from April 14th to 16th, when the following papers, among others, will be read in the Medical Section: psychical manifestations and *x*-ray diagnosis in cerebral tumour, by Professor C. Winkler of Utrecht; surgical treatment of cerebral tumour, by Professor H. J. Lameris of Utrecht; the study of intestinal motility, by Dr. E. Lauwers of Courtrai; aneurysm of the aorta, by Dr. A. de Groodt of Antwerp; operative treatment of the small prostate, by Dr. G. van Houtum of the Hague; gastric syphilis, by Dr. J. Koopman of the Hague; the question of diabetes, by Professor Hijmans van den Bergh of Utrecht; active immunization against diphtheria, by Professor H. Alderhoff of Utrecht; and the question of constitution in gynaecology and obstetrics, by Dr. R. Remmelts of Amsterdam.

THE next election to the Grocers' Company's research scholarships, founded to encourage original research in sanitary science, will take place in May next. They are each of the value of £300 a year, with an allowance to meet the cost of apparatus and other expenses, and are renewable for a second or third year. Forms of application and further particulars can be obtained from the Clerk of the Grocers' Company, Grocers' Hall, London, E.C.2.

THE house and library of the Royal Society of Medicine will be closed for the Easter holidays from Thursday, April 9th, to Tuesday, April 14th, both days inclusive.

THE Home Secretary has appointed a committee on mule-spinner's cancer, consisting of Sir Gerald Bellhouse (chairman), Professor A. H. Gibson, D.Sc., Mr. F. Holroyd, Mr. E. Judson, Sir Thomas Legge, M.D., Dr. Archibald Leitch, and Colonel A. B. Smallman, M.D. The committee's terms of reference are to consider the evidence at present available as to the occurrence of epitheliomatous ulceration among mule-spinners, and to report what measures are practicable for the protection of the workers and what regulations (if any) are required. The secretary of the committee is Dr. S. A. Henry, Home Office, Whitehall, S.W.1.

SIR THOMAS SHIPSTONE has intimated to the house committee of the Nottingham General Hospital his intention to subscribe £6,000 to the building fund, while the company of Messrs. T. Shipstone and Sons will contribute £3,000.

MESSRS. CASSELL AND CO., LTD., announce for early publication the eighth edition of *Manson's Tropical Diseases*, edited by Dr. Manson-Bahr.

THE Amsterdam Academy of Sciences has awarded the Leeuwenhoek medal to Dr. F. d'Herelle for his discovery of the bacteriophage. The previous recipients of this medal, which is awarded every ten years to those who have made the most valuable contribution to microbiology, have been Ehrenberg (1875), Cohn (1885), Pasteur (1895), Behring (1905), and David Bruce (1915).

Letters, Notes, and Answers.

ORIGINAL ARTICLES and LETTERS *forwarded for publication are understood to be offered to the* BRITISH MEDICAL JOURNAL *alone unless the contrary be stated.* Authors desiring reprints of their articles published in the BRITISH MEDICAL JOURNAL are requested to communicate with the Financial Secretary and Business Manager, 429, Strand, W.C.2, on receipt of proof.

ALL communications with reference to advertisements as well as orders for copies of the JOURNAL should be addressed to the Financial Secretary and Business Manager, 429, Strand, London, W.C.2. Attention to this request will avoid delay. Communications with reference to editorial business should be addressed to the Editor, BRITISH MEDICAL JOURNAL, 429, Strand, W.C.2.

CORRESPONDENTS who wish notice to be taken of their communications should authenticate them with their names—not necessarily for publication.

Communications intended for the current issue should be posted so as to arrive by the first post on Monday or at latest be received not later than Tuesday morning.

THE telephone number of the BRITISH MEDICAL ASSOCIATION and BRITISH MEDICAL JOURNAL is Gerrard 2630 (Internal Exchange). The telegraphic addresses are:

EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westrand, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westrand, London.*

MEDICAL SECRETARY, *Mediocre Westrand, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Rutland Square, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 4361 Central).

QUERIES AND ANSWERS.

"WEMIC."

DR. F. G. GARDNER (Oxford) writes as follows in reply to the correspondent whose question was published on March 21st (p. 579): Being much interested in words, I tried to find the above, but my search has been unavailing. I referred it to a high authority. He likewise was unable to trace it, but thought it might be a misspelling of "demic," a term much in use still in the North, and meaning an inflammatory swelling, an abscess, or whitlow. Evidently it is from epidemic.

DAZZLING HEADLIGHTS.

DR. JOSHUA KEYMS, D.O.M.S. (Southampton), writes in reply to Dr. R. M. Courtauld (March 21st, p. 586): The dazzle of motor car headlights is due to the physiological irregular astigmatism present in all lenses. It is this which causes a bright point of light to appear star-shaped, and the unpleasant effects of dazzle are the result when a brilliant light is encountered. As no one looks directly at the lights, there can be very little, if any, exhaustion of the macular region, and personally I have never been able to demonstrate a scotoma, unless the light be looked at directly. All glasses increase the dazzle by adding their own imperfections to the human lenticular astigmatism; and as the pupil is contracted I scarcely think that a myotic would have much extra effect. Two years ago I cut out dazzle by the use of a tiny shield close up to the pupil and projecting forwards. This offers no obstruction to the vision, and is so arranged that everything is seen, except the lights. The number of the approaching car can be read when near enough. I may say that this is a patent.

LETTERS, NOTES, ETC.

FIBROSITIS.

DR. T. GERALD GARRY (Cairo) writes to call in question the accuracy of statements made at a recent meeting of the combined Sections of Balneology and Climatology, Epidemiology and State Medicine, Medicine, and Therapeutics and Pharmacology, of the Royal Society of Medicine, to the effect that because of the "overcast skies on some days in winter and the great humidity of the Nile valley, the people complained of such pains [fibrositis] very much more than during the winter in England."

MATERNAL MORTALITY.

"A TOWN PRACTITIONER" writes: I am glad "A Country Practitioner," in your issue of March 21st (p. 586), has set the ball rolling as to maternal mortality in general practice. After all, it is the general practitioner who can supply us best with statistics. I remember well, some thirty years ago, I was present at a medico-legal case when a well known professor of forensic medicine was asked by the defending counsel, "How many confinements have you attended?" The answer was, "I have not attended one for over twenty years." The general practitioner was next called and he was asked about his last attendance at a confinement, and he said, "I attended two cases last night." This evidence weighed heavily with the judge. Since my own experience coincides with "Country Practitioner," why all this fuss about maternal mortality and puerperalism? These, in my own thirty years' experience, are on the decline. I have attended about 3,000 cases and the mortality is 3—namely, 2 cases of puerperal infection (this twenty-five years ago), owing to the old-fashioned midwife having previously nursed a case, and 1 case in which the patient was suffering from advanced endocarditis. What was the condition of midwifery thirty years ago? (1) A dirty woman met you on the stairs with a filthy apron, filthy nails, and a still filthier plate with a "chunk" of lard to examine the patient with. (2) The bedding was dirty, and soiled sheets were kept on until the event was over. (3) The patient generally lay in bed wearing all her dirty clothes and, at times, clogs. (4) Also, a custom here was not to disturb the patient for five days; the result, a horrible smell on entering the room and septic trouble. Thanks to the Central Midwives Board and better sanitation, "nous avons changé tout cela."

"R. B. G." writes: I agree with "A Country Practitioner" (March 21st, p. 586) suggesting that the maternal mortality is "grossly exaggerated"—like the report of Mark Twain's death. I have attended well over 1,000 midwifery cases and never had a death from "puerperal fever," and in my experience as medical officer of health during twenty years of a burgh of now 7,000 inhabitants have had only one notification of such death. Perhaps the Ministry of Health and the Scottish Board of Health might devote their attention to matters of a more pressing nature.

GALL STONES IN A BOY.

DR. R. F. JOWERS (Hove) writes with regard to the age of the patient (18 years) in the case of gall stones reported by Dr. Salisbury Woods (March 21st, p. 552): I may say that in April, 1921, I removed gall stones from a schoolboy, aged 16 years, suffering from acute cholecystitis. Curiously enough, he too had acute appendicitis, but a year later.

BRITISH DERMATOLOGICAL LITERATURE.

MR. C. J. CELLAN-JONES, M.B., F.R.C.S.Ed., who is at present assisting Professor Richard Volk in the Lupus Hospital, Vienna, writes as follows: Professor Volk has been asked to write the section on skin tuberculosis, light therapy and biology, in an authoritative work on skin and venereal diseases, edited by R. Jadassohn, and published in twenty-two volumes by Julius Springer of Berlin. Since the outbreak of war in 1914 Professor Volk has had no access to the work of British investigators, and naturally feels that, if he is unable to acknowledge their contributions to this section of dermatological research, his work will be quite incomplete. I feel certain that dermatologists who, between 1914 and the present date, have published original work in the section concerned will gladly lend copies, excerpts, or summaries of their papers to Professor Volk. His address is Wien viii Bez., Langegasse 63, 1 Stk., T. 13.

MEDICAL GOLFING SOCIETY.

THE honorary secretary of the Medical Golfing Society writes to inform our readers that in the knock-out tournament now proceeding the semi-finalists are T. P. Kolesar, L. W. Bathurst, A. W. Soper, M. S. Mayou.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 36, 38, 39, 42, and 43 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 40 and 41.

A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *140*.